

SUPPLEMENT.

The Mining Journal, AILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

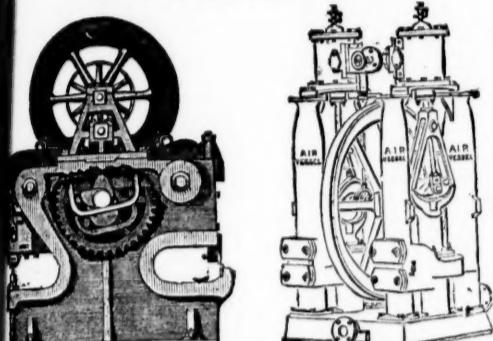
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2171.—VOL. XLVII.

LONDON, SATURDAY, MARCH 31, 1877.

PRICE (WITH THE JOURNAL) SIXPENCE.
PER ANNUM, BY POST, 21s.

JOHN CAMERON'S
SPECIALITIES ARE ALL SIZES OF
PUMPS, SHIPBUILDERS' TOOLS,
BAR SHEARS.
ESTABLISHED 1852.

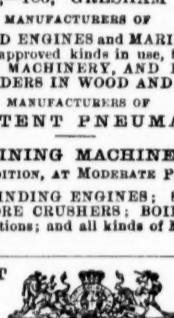


LDFIELD ROAD IRON WORKS,
SALFORD, MANCHESTER.



Represented by
Model exhibited by
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ENGINEERS AND GENERAL MERCHANTS,
HAYLE, CORNWALL,
LONDON OFFICE, 186, GRESHAM HOUSE, E.C.



SAFETY FUSE,
FIRE TO THE
BLASTING ROCKS, &c.

WON THE PRIZE MEDALS at the "ROYAL EXHIBITION" of 1861; at the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the "ART EXHIBITION," held in Paris, in 1855; at the "INTERNA-
TIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXHIBITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Al-
exandria, 1869; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna,
1873; and at the "EXPOSICION NACIONAL ARGENTINA," Cordova,
Argentina, 1872.

BICKFORD, SMITH AND CO.,
of TUCKINGMILL, CORNWALL; ADELPHI
WALL CHAMBERS, SOUTH JOHN-STREET, LIVER-
POOL; and 88, GRACECHURCH-STREET, LONDON,
E.C., MANUFACTURERS AND ORIGINAL
PATENTEES OF SAFETY-FUSE, having been in-
formed that the name of their firm has been attached to
fusé not of their manufacture, beg to call the attention of
the trade and public to the following announcement:—
EVERY COIL OF FUSE MANUFACTURED BY THEM HAS TWO SEPARATE
LEADS PASSING THROUGH THE COLUMN OF GUNPOWDER, and BICK-
FORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS AS
THEIR TRADE MARK.

ALEX. CHAPLIN AND CO.,
TRANSTONHILL ENGINE WORKS, GLASGOW.

PATENTEES AND SOLE MANUFACTURERS OF
CHAPLINS' PATENT STEAM CRANES, HOISTS,
LOCOMOTIVES, AND OTHER ENGINES AND BOILERS.
LONDON HOUSE:—
MCKENDRICK, BALL, AND CO.,
18, QUEEN VICTORIA STREET, LONDON, E.C.

STANDARD LUBRICATING OILS
COMPANY, LIMITED.

DARK AND PALE OILS for MACHINERY, RAILWAY, and MINING
PURPOSES, from TWO SHILLINGS per gallon, and upwards.

AGENTS WANTED.
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R. W. F. STANLEY, MATHEMATICAL INSTRUMENT
MANUFACTURER TO H.M.'S GOVERNMENT, COUNCIL OF INDIA
AND ART DEPARTMENT, ADMIRALTY, &c.
MATHEMATICAL, DRAWING, and SURVEYING INSTRUMENTS of every
description, of the highest quality and finish, at the most moderate prices.
Price-list post free.

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ADDRESS—GREAT TURNSTILE, HOLBORN, LONDON, W.C.



PARIS, ORDER OF THE CROWN OF PRUSSIA. PALMOUTH,
BRONZE MEDAL, 1867. SILVER MEDAL, 1867.



A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the St. GOTTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gotthard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24-90, 27-60, 24-80, 26-10, 28-30, 27-10, 28-40, 28-70 metres. Total advance of south heading during January was 121-30 metres, or 133 yards.

In a series of comparative trials made at the St. Gotthard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere (7½ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL; and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

These Machines possess many advantages, which give them a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL USE THROUGHOUT THE WORLD FOR MINING, TUNNELLING, QUARRYING, AND SUB-MARINE BORING.

THE MCKEAN ROCK DRILLS are the most powerful—the most portable—the most durable—the most compact—of the best mechanical device. They contain the fewest parts—have no weak parts—act without SHOCK upon any of the operating parts—work with a lower pressure than any other Rock Drill—may be worked at a higher pressure than any other—may be run with safety to FIFTEEN HUNDRED STROKES PER MINUTE—do not require a mechanic to work them—are the smallest, shortest, and lightest of all machines—will give the longest feed without change of tool—work with long or short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or open work. Their working parts are best protected against grit and accidents. The various methods of mounting them are the most efficient.

N.B.—Correspondents should state particulars as to character of work in hand in writing us for information, on receipt of which a special definite answer, with reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,
IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

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ENGINEERS.

OFFICES,
42 BOROUGH ROAD, LONDON, S.E.; and
5, RUE SCRIBE, PARIS.

MANUFACTURED FOR MCKEAN AND CO. BY
MESSRS. P. AND W. MACLELLAN, "CLUTHA IRONWORKS,"
GLASGOW.

The Warsop Rock Drill

(Involving an entirely new principle in Mechanical Boring)

Requires only 20 lbs. steam or air-pressure.

Has only two moving parts—thus ensuring freedom from derangement, and is absolutely self-feeding.

Is excessively light, and can be carried by one man, who can with the No. 1 size (weighing only 35 lbs.) drill 40 holes in diameter and 1½ in. deep per minute, in the hardest Aberdeen granite for splitting purposes.

**WARSOP AND HILL,
HYDRAULIC AND GENERAL ENGINEERS.**

NOTTINGHAM.

STEAM and HYDRAULIC WINDING and PUMPING ENGINES
of all kinds.

DUNN'S ROCK DRILL,

AND

AIR COMPRESSORS,

DRIVING BED ROCK
TUNNELS, SINKING
SHAFTS, AND PERFORMING
OPEN FIELD OPERATIONS,
IS THE
CHEAPEST, SIMPLEST,
STRONGEST, & MOST EFFECTIVE
DRILL IN THE WORLD.

OFFICE, 193, GOSWELL ROAD

(W. W. DUNN AND CO.)

LONDON, E.C.

THE PATENT SELF-ACTING MINERAL DRESSING MACHINE COMPANY

(LIMITED).

T. CURRIE GREGORY, C.E., F.G.S.

OFFICES, GLASGOW: 150, ST. VINCENT STREET.

LONDON: 85, GRACECHURCH STREET, E.C.

IMPORTANT NOTICE TO MINE PROPRIETORS.

M. R. GEORGE GREEN, ENGINEER, ABERYSTWITH,
SUPPLIES MACHINES under the above Company's Patents for
DRESSING all METALLIC ORES. Dressing-floors having these Machines pos-
sess the following advantages:—

- 1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.
- 2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED
BY DRESSING-FLOORS IS REQUIRED.
- 3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND
FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.
- 4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN
FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines, Darlington, Colberry, Nantthead, and Ballyhope; the Stonecroft and Greyside Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Egremont, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines, Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Bratberg Copper Mines, Norway, and Mines in Italy, Germany, United States of America, and Australia, from all whom certificates of the complete efficiency of the system can be had.

WASTE HEAPS, consisting of refuse cherts and skimpings of a former washing, containing a mixture of lead, blende, and sulphur, DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—“The yearly profit on our Nantthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore stuff from the mines. Of course, if it had been wholly engaged in dressing waste, our return would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant.”

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—“I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method.”

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines, says—“Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is a £1 much short of 10 per cent.”

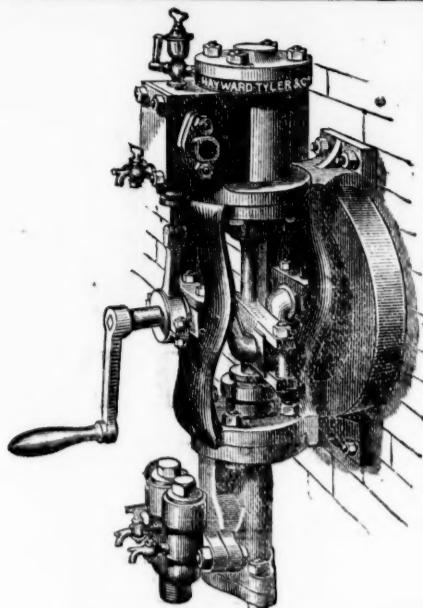
GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—“The separation which they make is complete.”

Mr. MONTAGUE BEALE says—“It will separate ore, however close the mechanical mixture, in such a way as no other machine can do.”

Mr. C. DODSWORTH says—“It is the very best for the purpose and will do for any kind of metallic ores—the very thing so long needed for dressing-floors.”

Drawings, specifications, and estimates will be forwarded on application to—

GEORGE GREEN, M.E., ABERYSTWITH SOUTH WALES.



**FLY-WHEEL
DONKEY PUMP,
FOR
Feeding Steam
Boilers.**
—
SIMPLE, AND ALL PARTS
ACCESSIBLE.

HAYWARD TYLER AND CO., 84, Whitecross Street, London, E.C.



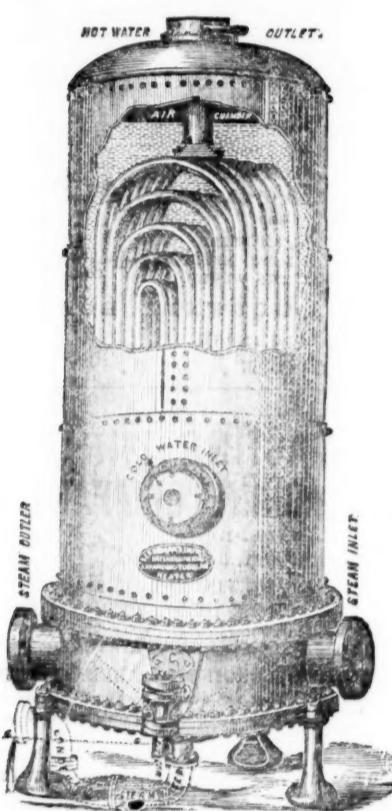
BOLTS, NUTS, AND COACH SCREWS.

ARCHER AND HARPER,

PROVIDENCE BOLT AND NUT WORKS, THE GREEN, DARLASTON,

Manufacturers of all kinds of Shipbuilders', Engineers', Coach, Wagon, and Fish Bolts: Coach Screws; Railway Spikes and Broads; Hot-pressed and Forged Nuts, Rivets, Washers, &c., &c.

SHIPBUILDERS' AND RAILWAY STORES' CONTRACTORS.

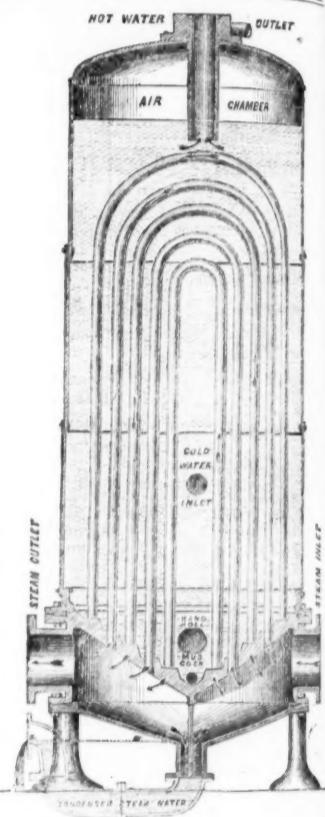


IMPORTANT.

The outlet end of the condensed steam-water pipe, shown in dotted lines, may be continued to any distance from the Heater, so long as it discharges on a level with the Cone bottom, as shown at *a a*, or it may go any depth into the ground, so as to form a siphon.

In cases where the cold water pump is attached to the engine itself, a RELIEF VALVE should be placed on the feed pipes. When a separate donkey pump or injector is used, no valve is required.

**JOSEPH WRIGHT & CO.
(LIMITED),
NEPTUNE FORGE, ENGINE
AND BOILER WORKS,
TIPTON, STAFFORDSHIRE,**



Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL TO METAL, and every tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the tubes because of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the WATER WORKS PRESSURE is sufficient no pump or injector is needed.

The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, the sewage and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-HOUSES, AQUARIAS, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERMIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using TWO HUNDRED AND THIRTY-THREE of these Heaters.

Now ready, price 3s., by post 3s. 3d., Sixth Edition; Twenty-thousand Copies much improved, and enlarged to nearly 300 pages.

HOPTON'S CONVERSATIONS ON MINES, between Father and Son. The additions to the work are near 80 pages of useful information principally questions and answers, with a view to assist applicants intending to pass an examination as mine managers, together with tables, rules of measurement, and other information on the moving and propelling power of ventilation, a subject which has caused so much controversy.

The following few testimonials, out of hundreds in Mr. Hopton's possession, speak to the value of the work:—

"The book cannot fail to be well received by all connected with collieries."—*Mining Journal*.

"Its contents are really valuable to the miners of this country."—*Miners Correspondence*.

"Such a work, well understood by miners, would do more to prevent collier accidents than an army of inspectors."—*Colliery Guardian*.

London: MINING JOURNAL Office, 26, Fleet-street; and to be had of all book sellers.

BORING AND SINKING.

WILLIAM COULSON AND SON

Are prepared to UNDERTAKE BORINGS for MINERAL EXPLORATION, either from the SURFACE or UNDERGROUND WORKINGS; BORINGS for WATER SUPPLIES or TUNNEL SOUNDINGS, &c., at fixed prices, according to the size of bore-hole required; also to EXAMINE and REPORT upon the BEST MEANS to SECURE DEFECTIVE TUBING.

Plans and specifications prepared for Shaft Tubbing, Wedging Cribs, Pumping, and General Sinking Arrangements.

Address: **W. COULSON AND SON, SHAMROCK HOUSE, DURHAM.**

MARCH 31, 1877.

SUPPLEMENT TO THE MINING JOURNAL.

347

Original Correspondence.

MINING IN QUEENSLAND.

SIR.—The quantity of tin forwarded by rail from the Warwick Terminus for the past two months was as follows:—

	Stream tin.	Ingot tin.	Total.
November.....	481 3 2 23	—	Nil
December.....	423 8 2 21	—	—
The total production of Australian tin for the past half-year was as follows:—			
Stream tin. Ingot tin. Total.			
Third quarter. Tons c. q. lbs. Tons c. q. lbs. Tons c. q. lbs.			
Wd. Warwick ... 1132 1 2 14 ... 5 4 3 20 ... 1137 6 2 6			
Murrurundi ... 481 0 0 0 ... — ... 481 0 0 0			
Grafton (Port) ... 411 13 2 18 ... — ... 411 13 2 18			
Total-quarter... 2024 15 1 4 ... 5 4 3 20 ... 2030 0 0 24			
Fourth quarter. Warwick ... 1305 7 3 16 ... 5 7 2 12 ... 1310 15 2 0			
Murrurundi ... 481 19 2 7 ... — ... 481 19 2 7			
Grafton 744 17 0 18 ... 1 8 2 0 ... 746 5 2 18			
Total-quarter... 2532 4 2 13 ... 6 16 0 12 ... 2539 0 2 25			
Total-half-year. 4556 19 3 17 ... 12 1 0 4 ... 4569 0 3 21			

Gross total—year 8602 12 1 1 ... 61 9 2 22 ... 8664 1 3 23
Decrease on the past half-year 220 tons, and on the past year 280 tons stream tin.

But it must be remembered that an excessive quantity of the tin raised in 1875 was sent to port during the second half of that year, and further, that while 1875 was estimated at 68 per cent. fine, we may safely estimate the past year's stream tin at 70 per cent. fine.

For the better information of your readers let me recapitulate the figures for the past two years:—

	Stream tin.	Ingot tin.	Total.
First quarter. Tons c. q. lbs. Tons c. q. lbs. Tons c. q. lbs.			
Wd. Warwick ... 1026 3 1 7 ... 15 10 1 22 ... 1041 13 3 1			
Murrurundi ... 700 0 3 25 ... — ... 700 0 3 25			
Grafton 478 0 0 0 ... 13 0 0 0 ... 491 0 0 0			
Total 2204 4 1 4 ... 28 10 1 22 ... 2232 14 2 26			

	Stream tin.	Ingot tin.	Total.
Second quarter. Warwick ... 849 17 3 7 ... 7 17 1 12 ... 875 15 0 19			
Murrurundi ... 506 0 3 25 ... — ... 506 0 3 25			
Grafton 485 9 1 4 ... 13 0 3 12 ... 498 19 0 16			
Total 1841 8 0 8 ... 20 18 0 24 ... 1862 6 1 4			

	Stream tin.	Ingot tin.	Total.
Third quarter. Warwick ... 1132 1 2 14 ... 5 4 3 20 ... 1137 6 2 6			
Murrurundi ... 481 0 0 0 ... — ... 481 0 0 0			
Grafton 411 13 2 18 ... — ... 411 13 2 18			
Total 2024 15 1 4 ... 5 4 3 20 ... 2030 0 0 24			

	Stream tin.	Ingot tin.	Total.
Fourth quarter. Warwick ... 1305 7 3 16 ... 5 7 2 12 ... 1310 15 2 0			
Murrurundi ... 481 19 2 7 ... — ... 481 19 2 7			
Grafton 744 17 0 18 ... 1 8 2 0 ... 746 5 2 18			
Total 2532 4 2 13 ... 6 16 0 12 ... 2539 0 2 25			

Gross total—1876 8602 12 1 1 ... 61 9 2 22 ... 8664 1 3 23
which at 70 per cent. fine would equal 6033 tons pure tin.

In the Journal of Aug. 29, 1876, I have given in detail, in the same way, the years 1874 and 1875, the gross totals of which were:—

	Stream tin.	Ingot tin.	Total.
First quarter. Tons c. q. lbs. Tons c. q. lbs. Tons c. q. lbs.			
Wd. Warwick ... 1026 3 1 7 ... 15 10 1 22 ... 1041 13 3 1			
Murrurundi ... 700 0 3 25 ... — ... 700 0 3 25			
Grafton 478 0 0 0 ... 13 0 0 0 ... 491 0 0 0			
Total 2204 4 1 4 ... 28 10 1 22 ... 2232 14 2 26			

	Stream tin.	Ingot tin.	Total.
Second quarter. Warwick ... 849 17 3 7 ... 7 17 1 12 ... 875 15 0 19			
Murrurundi ... 506 0 3 25 ... — ... 506 0 3 25			
Grafton 485 9 1 4 ... 13 0 3 12 ... 498 19 0 16			
Total 1841 8 0 8 ... 20 18 0 24 ... 1862 6 1 4			

	Stream tin.	Ingot tin.	Total.
Third quarter. Warwick ... 1132 1 2 14 ... 5 4 3 20 ... 1137 6 2 6			
Murrurundi ... 481 0 0 0 ... — ... 481 0 0 0			
Grafton 411 13 2 18 ... — ... 411 13 2 18			
Total 2024 15 1 4 ... 5 4 3 20 ... 2030 0 0 24			

Gross total—1876 8602 12 1 1 ... 61 9 2 22 ... 8664 1 3 23
which at 68 per cent. fine equals 6082 tons of pure tin.

These figures show conclusively that the 4% rise which has taken place in the price of tin within the past six months has given production a slight impetus. That no falling off in quantity has occurred; and I may with confidence assert there is no nearer prospect of the Stanthorpe and New England tin fields giving out than there was when I summarised the year's production twelve months ago. The reverse is, in fact, the case, as the more work that is done the more apparent is the extent and richness of the field. I am sorry to see by those last returns that smelting on the field has turned out a miserable failure, and has now altogether ceased. The numerous public companies floated to work this great deposit have failed, with only one exception, most lamentably, proving beyond doubt that they were one and all swindles floated to gull the public. It is strange, but nevertheless true, that men are now getting a good income out of the very ground abandoned by those companies.

In other metals, copper is again coming to the fore. There are some splendid mines to be had for 5 per cent. of their English value in this colony, many rich deposits lying undeveloped for the experience necessary and a little capital to work them. A strong English company that would send out experienced men here and purchase up the freeholds of a dozen of these mines, and work the best of them, would pay an enormous dividend.

Gold all over the colony is holding its own in production. Gympie is looking up again, and the north is extending every year; the issue is, I think, increasing, at least, it is more permanent, as the reefs are everywhere opening out very fine.

RESIDENT.

Brisbane, Jan. 23.

AUSTRALIAN GOLD COMPANIES, AND MR. DICKER.

SIR.—"Shareholder," in last week's Journal, complains of the way in which he has been persuaded to "invest" by Mr. Dicker, in certain mines which have come to grief. To the list given by him I am unfortunately able to add another—the London and St. Arnaud Mining Company, which I was induced by Mr. Dicker and his respectable journal to put some money into, and like "Shareholder" find it now to be a total loss. I am also in the Australian Mines Investment Company, which without any satisfactory reason had no annual meeting in 1876, and whose shareholders find no explanation forthcoming of how their money has been made ducks and drakes of. I am afraid, however, that they will require some pressure to cause them to disgorge what remains of the capital of the Australian Mines Investment Company and other schemes, and if "Shareholder" and others similarly minded will join with me, perhaps things may be put in train for this being done. With regard to the Australian Mines Investment Company, I think the course is quite clear for the shareholders to insist on its being wound up at once, the stocks held to be sold by auction in Australia or New Zealand, as the case may be, and the surplus divided amongst the shareholders. With a board of directors which apparently does nothing but look on, and eats up 30 per cent. of the miserable proceeds, I do not think there can be two opinions about the desirability of this course. [I enclose my address.] DONE.

NEW QUEBRADA COMPANY.

SIR.—May I trespass so far on your kindness to draw attention to the treatment the shareholders in the above company receive? Last January a meeting was held, and various statements made of progress in the mines and railway connecting it with the sea coast. The next meeting will be held in July or August, in the meantime what objection can there be to short extracts of the news by each mail in your recognised organ of the mining interests, as is done by most of the well-managed mining companies. At present country and non-speculative shareholders, who are the backbone of any company, are kept quite in the dark as to the progress that is being made, as it is impossible for them to apply at the office of the company, so that they are at the mercy of various speculators on the Stock Exchange, who seem to have special means of knowing what is going on. Mr. Hemmings when elected to a seat on the board, and who now so ably fills the post of managing director, gave a

positive promise that such should be the case if he was elected, but in the "sweets of office" he seems to have forgotten his early promise.

A SHAREHOLDER.

THE COPPER LEAD, AND HEMATITE MINING COMPANY OF LANZI, TUSCANY.

SIR.—It may be of some interest to many of your readers to know that the above extensive property, of about 1000 acres freehold, has been purchased and is being worked by an English company. Operations have been carried on for upwards of two years, shafts have been sunk, and levels driven, and with such eminently satisfactory results that the company are sanguine enough to believe it will be one of the great mining prizes; but this should not be unexpected, as it was known before the Christian era as abounding in minerals. The property by the coast is connected by a good road with the railway which runs to Leghorn. The necessary dressing machinery is being prepared. Two steam-engines and crusher, with other appliances, have already been dispatched, and sales of ore will soon begin. Subjoined are the last reports from the general manager, Mr. Simkin, and the captain, Mr. Boyns. One of the lodes referred to is 60 ft. wide, and mineralised throughout. The other one mentioned is 30 ft. wide.

A DIRECTOR.

Temple-Row, Birmingham, March 29.

Lanzi Mines, March 18.—No. 1 cross-cut, in the lead lode, is opening good ground for lead and blende. No. 4 drive has improved lead and blende in good mineral ground. No. 1 stope, south side of No. 1 cross-cut, is in fair mineral ground. No. 2 stope, north side of No. 1 cross-cut, is improved for mineral in paying ground. No. 3 stope, side of No. 4 drive, is in fair lead ground. The ore dressing and the incline tramway are progressing fairly.—King's Lode: We have been obliged to suspend working from the water having risen in the level and bottom of the shaft owing to late rains; when the water goes down to its former level we shall work again here.—JOHN BOYNS.

March 15: There is not much change in the quality of the stuff raised for the month; the greatest change is in No. 1 cross-cut, and the last 6 ft. has been turned out a great deal of blende of a splendid quality. I have let another drive to-day to go at right angles in the blende ground. JAMES SIMKIN.

March 19: Since I wrote, March 15, No. 1 drive continues in the same blende ground, and is also turning out pretty well of lead. The new drive (No. 6) is equally good for both lead and blende. No. 4 drive is in fair ground for ore, but very hard. Nos. 1 and 2 stopes are in paying ground. No. 3 new stope is good for blende. About 6 tons of dressed ore are put to pile this week. Nothing new at King's lode; sinking the top shaft is making good progress. The name of the *Lanzi* seems to be spreading. I have had several mining engineers to pay me a visit lately, mostly Germans, two of whom are managers of large mines in the Massa district. They say they never saw anything like it before, such a mass of ore ground. On Friday I had the chief engineer of the Vieille Montagne Company of Belgium, the largest zinc smelters in the world; he speaks highly of our blende, and he took samples out of Nos. 1 and 6 drives, which he said contained 50 per cent. of metallic zinc. He said he should send the managing director to see me. I have had a letter from a Mr. Humphrey to say he is going to pay me a visit to-morrow; he is from Spezia, the largest lead smelter in Italy. He says he can give the freight more for the lead than I could get in England, as he says he has to purchase a great deal of English lead. JAMES SIMKIN.

March 22: I am pleased to say that the new drive (No. 6) is turning out splendid ore, both of lead and blende, and in consequence of the ground being full of ore we have made good progress: I have no hesitation in saying the whole of this drive would yield more than 35 per cent. of metal. I told you a fortnight ago that we had passed through good ground in No. 1 drive, but I did not want to make much of it until I had proved it further, as it might have been only a patch; we passed through about 9 ft. with No. 1 drive, which was nearly as good as what No. 6 is turning out. No. 1 is still in good ground, and I am glad to say *Lanzi* never looked so well as it does to-day. I received the bill of lading of the machinery.—JAMES SIMKIN.

SLIME DRESSING—SLIME PITS v. "SPITZKASTEN."

SIR.—No one who has seen dressing floors need to be informed that in the manifold operations connected therewith a good deal of slime consisting of ore and matrix in suspension, is carried off by the water, and that slime pits are a necessary adjunct to the dressing floor if a considerable quantity of finely pulverised ore is not to be lost. Generally it is found more convenient to have a series of small pits than one or more large ones, the advantage of the former being that they can be more easily cleaned up. Now, this cleaning up involves a great deal of labour and consequent expense. Could not some plan be devised to save this labour? Suppose we were to build our slime pits aboveground, instead of, as is generally done, in the ground, and at such a height above

was 1801*l.*, but the accounts included 2500*l.*, which Capt. Tregay had given for the mine, &c., so that so far as the working was concerned the debit balance would then be 4301*l.* This makes the total loss in working the mine from May 14, 1875, to Aug. 4, 1876 (14 months), just 16,525*l.*, or at the rate of 1130*l.* per month. The calls, as I said, to meet the loss of the final 13 months amounted to 15,820*l.*, so that I think I was pretty correct, and so much for Capt. Tregay's denials and his facts. It should be added that the above debit balances are those which appear in the published accounts, after taking credit as good for all calls in arrear and other assets, much of which I fear are not recoverable, so that the calls fall particularly heavy on those that are able to pay.

Knowing well, as Capt. Tregay must do, the long patience and heavy loss of the shareholders in the late company under his management, I think he would have acted with more wisdom and discretion had he readily come forward in a frank and open manner to give every explanation asked for. His evasive answers have led to the prolongation of the discussion, and have alone induced me to enter into it.—*March 27.*

W. X.

BEDFORD UNITED MINES.

SIR.—I should not have troubled you with any further correspondence in reference to this mine but that some of our shareholders are of opinion the letter of "A Vigilant Shareholder" calls for a reply. To refer to the resolutions passed unanimously at the general meeting, I cannot conceive what there is in them to deserve severe criticism. The request that Captain Goldsworthy should sign all future cost-sheets was never intended to cast reflection upon anyone connected with the mine prior to or since his appointment, and no actual reason can be assigned, saving that it has become the rule of this office that all cost-sheets should bear the signature of the manager or agent of the company, and although the resolution was passed at the meeting it was meant to convey that the costs should be signed by Captain Goldsworthy as soon as he was able to resume his duties. Whatever your correspondent may think, he certainly makes much out of little, and one would almost fancy that the nomination of a storekeeper was in consequence of a gross direction of duty on the part of some one or other. I merely stated at the meeting that it was proposed to place the stores in the charge of one of the old servants of the company, and make him responsible for the receipt and delivery of all goods; and the determination we have come to is simply with a view to effect a slight improvement in the old system, good enough in its way, with regard to the receipt and supply of all materials. Our purse and resident agent of the company have been connected with the mine for over 30 years, and if any suspicion exists in the minds of the shareholders (as your correspondent would make believe) that they are untrustworthy, I can only say that for honesty and integrity they could obtain a certificate that would carry them into a far better position than the shareholders in this mine can at present afford to place them; at the same time I am not without hope that the time is not far distant when the company will be able to prove to them that long and faithful services are not to be entirely ignored. Referring to what your correspondent calls the manager's house, the committee, feeling that it was absolutely desirable that Capt. Goldsworthy should be residing on the spot, expended a few pounds in converting a portion of the account-house into a setting and bed room for his use, but as the whole of his serious illness is attributed to the dampness of the place it may be for us to reflect whether we have not (inadvertently all will admit) been the cause of much suffering and pain, let alone heavy expenses attendant on his absence from business. I assume a single man requires the comforts of a home as well as ourselves, and as Capt. Goldsworthy while in his place was doing his duty to his employers, I am under the impression that his employers should not fail to do their duty to him, and secure him as far as lay in their power health and comfort. My letter in your Journal of last week explains what is proposed to be done, therefore, I need not enter any further into the matter. Although Capt. Dodge was desired to take charge of the mine in Capt. Goldsworthy's absence all minor details would as a matter of course be left in his hands, at the same time it was considered advisable that Capt. Dodge should from time to time consult with the manager respecting underground operations.

Replying to your correspondent's enquiry, I beg to assure him that the Bedford United Mines affairs are conducted by a committee of gentlemen, and neither he or the shareholders can say that I as the secretary manage the property, or that the manager or any servant of the company is a tool in my hands. We, one and all, endeavour to do our duty to our employers, and so long as the adventurers may please to retain our services they may rest assured that no exertions on our part will be wanting to take proper care of their interests. Far better authorities than I have expressed a favourable opinion of the Bridge lode, but it is evident from the garbled statement of your correspondent that the information he has obtained has somewhat confused him. I have by me the reports on the mine since 1846, and consequently have something to refer to. A good deal of work has been carried on in the south lode, and practical miners are in favour of a still further vigorous development of that part of the set. Most mining men know that it is necessary to open levels some distance before putting down winzes to advantage, but this is a question the agents of the mine are most competent to decide upon, and long ere this I do not doubt that the Government Inspector has been well satisfied that we know how to work the mine, and that we should readily comply with any suggestions from him; therefore, the gratuitous advice of a "Vigilant Shareholder" is not needed by us, let alone by a gentleman holding the responsible position of Dr. Foster. The shareholders may be content to accept the statement of the Chairman that the present and past call would place the mine in a good position, and facts will before long prove it. In my humble opinion the time is not far distant when something more substantial will satisfy the shareholders that the executive are fully competent to manage the company's affairs, and my impression is that it would be materially to their interest to let well alone. I cannot see that the failure of a mine can in any way be owing to the not holding meetings on the mine, and so giving distant shareholders the opportunity of visiting their property, and I am at a loss to know in what part of the report or minutes of the meeting the "result of the watchfulness and practical knowledge of local shareholders" is to be found. If your correspondent will enlighten me I will make a note of it for future reference. Unfortunately the alleged money making propensities of mining secretaries are not so productive of results as one would be led to believe, and mining, now at a very low ebb, will not be improved by such absurd and ridiculous remarks as emanate from your correspondent "A Vigilant Shareholder." Local shareholders are always able to obtain any information respecting the working of the mine, and I am quite sure any one of our adventurers paying a visit to Bedford United would be well received, and every possible attention shown to him. Distant shareholders do not require a meeting on the mine to enable them to see their property, and I question much whether anyone residing 50 miles from the spot would take the trouble to attend a meeting were one convened. Where the greater portion of the shares are held in London and the suburbs, as is the case in Bedford United, then it is considered meetings should be held, and being a central place of business it would be far more convenient to country shareholders if inclined to attend them to travel 250 miles to read the before-mentioned results. The whole tenor of your correspondent's letter is more or less to abuse the committee and myself, instigated doubtless more by a desire to find favour amongst a select few, for obvious reasons, than to further the interest of his co-adventurers.

T. B. LAWS.

SIR.—As I am dissatisfied with the recent proceedings of the ruling powers of these mines, I have read the letters relating to them which appeared in the Journal of the past two weeks with avidity. I need scarcely say that I fully agree with the sentiments expressed in these letters and am persuaded that some change for the better management of the company's property should, if possible, be brought about. I am willing, therefore, to lend assistance in case a meeting be called for this purpose. Two subjects, however, named in these letters appear to me of not much importance compared with some others. These two subjects are the manager's residence and the appointment of a storekeeper. I have considered these matters

a little, and can suggest an easy and, I think, an agreeable way out of the difficulty. As my plan is an economical one of doing it I deem it advisable, and as a shareholder a duty, to lay it before the committee for their consideration, and if they think well of it their adoption. It may be that the committee have not duly considered the case of the manager's residence in all its bearings, for I would suggest that, on account of the alterations already made in the large account-house on the mine, it would be a far more suitable and convenient residence for a sickly manager, especially as he is an unmarried man, than can be made elsewhere, because if he should feel unusually unwell, as may occasionally be expected, some of the young women attending the office could administer to his wants, and, at the same time, he would be on the spot to carry on the business of the mine, and know all that was doing. In reference to the appointment of a storekeeper, I would suggest that the committee politely petition some of the officers to only take 5*½* days driving for airing and pleasure in each week, instead of six days; he might manage to attend to the store department by arranging to have all materials brought into the mine and all deliveries executed on that particular half-day. During this half-day in each week the horse could rest for shoeing, and the coach and harness undergo a thorough examination and repair for the next 5*½* days' run without further loss of time or inconvenience to the officers or their friends.

Q. K.

ROMAN GRAVELS MINING COMPANY.

SIR.—In last week's Journal a statement appears that this company sold their last parcel of ore (220 tons) to the Burry Port Smelting Company. As this is a misstatement that is likely to cause grave concern to the shareholders, I shall be obliged if you will contradict it in your next issue. None of the ore for sale on the 15th inst. was sold to the firm in question, and I may add that their indebtedness to us is under 1700*l.* F. F. WILSON,

St. Helen's place, March 28.

Secretary.

NEW CONSOLS.

SIR.—The news that a petition for winding-up the affairs of this mine is in the Vice-Warden's Court surprised me very much. Not long ago I heard the manager say he could and would if allowed by the directors to do so (by stopping the additional works) show a clear profit of 1000*l.* per month. Instead of taking his advice the directors have prosecuted expensive works to the extent of their borrowing ability, and to get time for payment of the debts due they have been compelled to petition the Vice-Warden's Court. The petition led to a meeting of the merchant creditors, and to an arrangement under which the works will be continued. Capt. R. Pryor is a good manager, but he is unfortunately under the control of a body of directors whose over-ruling has brought the concern to the margin of a catastrophe. Very few mines can long endure the control of a board of London directors, who generally, by extravagance and folly, bring the mines to grief. The sooner the company dissolve their board the better it will be for them. I question whether New Consols will prosper much while in the hands of such incapable men: 40,000*l.* due on bonds; 17,000*l.* to merchants; and 4000*l.* for labour costs—61,000*l.*!! It would appear from the amount due that nearly all their works have been done on credit. The shareholders cannot have subscribed much for the working of the mine; the working expenses must have been paid from loans, and from the returns of tin, copper, arsenic, and silver from the mine. It will take more than five years at a profit of 1000*l.* per month to pay off these liabilities.

Directors are expensive things, and all the expense is so much wasted, besides the evil they do in the misdirection of the works by overruling the agents. I would say to the shareholders throw them out, and let Capt. Pryor manage the mine in his own way. If they do so they will a year hence rejoice that they took my advice, which I give—free of charge—from no motive but a hearty desire to see a promising mine fairly dealt with.

Caststock Hotel, March 26.

AN OBSERVANT MINER.

NEW CONSOLS MINING COMPANY.

SIR.—The appointment of a powerful local committee, who are interested to the extent of many thousands of pounds in the works at New Consols, has been well received at this little town, dependent as it is on the prosperity of mining. A great deal has been said from time to time with reference to the non-success of the works at New Consols, but the persons most active in speaking in contemptuous terms of the company's operations have been those knowing little or nothing of the mode by which the mine stuff has been treated, nor of the difficulties connected with its treatment. It is the belief of all the local people who have seen the management at the mines that sheer economy alone would give profits, and I do hope that the committee now appointed will exercise a sharp look out on the expenditure of every penny. It is not the right system for a mine manager to be the purser, nor for the manager to obtain all the supplies without the approval of the committee. I do not impeach the honesty of the manager in any shape, but I do know this, that he should be restricted to his work of looking after the men both underground and at surface, and to making such recommendations to the committee as he may think proper, and he should live upon the mine. The duties of the committee should be to check the earnings of the men, and to pay them, to examine all accounts, and to exercise watchfulness and economy in all the departments. The manager must be under the committee, and the relative positions between the two always preserved. The committee occupy a very delicate and responsible position; they are the guardians of the property of the shareholders, and any failure on their part to perform their duties will bring about a lamentable result ere long, but beyond this they are really representing the numerous creditors of the concern, who have every confidence in them, and who look to them as the means by which their debts will be paid. As we understand it down here, a clean sweep will be made, and the concern started on a new basis, and whoever may be the manager, I hope my suggestions will be observed. The expenditure at New Consols has been immense; the system of working their ores is of vast importance to the county, and it remains for the committee to produce the results. Everyone is watching them with great interest, and that success may attend them is the sincere hope of—

*A CALLINGTONIAN.**Callington, March 29.*

SOUTH CONDURROW MINING COMPANY.

SIR.—By the remarks of "X. Z." in last week's Journal, he is evidently better acquainted with the mine than the public generally, and I entirely agree with every line he has written on this and his letter on the whole; but from the remarks he makes as to Wheal Grenville being able to follow our great tin lode before the 90 is reached would lead some who are not acquainted with the facts to suppose below that level the South Condurrow people had no control over that lode. Without disparagement to Wheal Grenville, which I trust may still prove a great success, the fact is about the end of October, 1875, Mr. Pendarves granted a new sett to the South Condurrow Company for 21 years, at 1-24*th* dues, which will enable Capt. Rich to follow that great and rich lode for another 150 fms. in length and to any extent in depth, besides which this sett takes in the whole of Wheal Grenville lodes. Here I should like to ask mining men of practical experience what they think of the value of this addition to South Condurrow sett? I shall never live to see the result, but I sincerely believe that this mine is destined to become one of if not the greatest Cornwall ever produced, yielding great riches to Mr. Pendarves for his liberal treatment, and paying to the fortunate shareholders constant dividends so long as they will require them, and their grandchildren after them.

March 26.

AN OLD SHAREHOLDER.

VIRTUOUS LADY MINE.

SIR.—Positive statements have within the past few weeks appeared in the Journal to the effect that a lode exists in this mine which in places is 100 ft. wide, containing throughout from 5 ozs. to 7 ozs. of silver per ton, besides gold and other riches. Now, without desiring to review the outrageously extravagant statements of a similar kind made during the last working of this mine, and without dwelling on the disastrous failure of the whole scheme, except to a few individuals who shall be nameless, I crave permission in the interest of legitimate mining to solicit, through the medium of the Journal, the attention of the proprietor of the land to these bold statements, and before any great amount of capital is again expended he will confer a favour on the mining public if he will have the goodness to ascertain if this enormous deposit of wealth really exists almost within view of his own mansion. The author

of the "Rhapsodies" never having himself seen a course of ore and his knowledge of the practical extraction of silver being of the most limited kind, no injustice can be done him in soliciting the owner of the land (who is an honourable gentleman and one of Her Majesty's Ministers) to send his mine agent to take an average sample of the lode, and if it is the case, to state publicly that a lode has been left behind by old practical miners worth hundreds of pounds per ton for the full width of the lode for silver alone, besides gold, copper, and other products.

*BUCKLAND MONACHUM.**March 27.*

CARDIGANSHIRE MINES, A.D. 1877—No. IX.

SIR.—I promised in my last to begin my remarks with the East Darren Mine. I may say, to commence with, probably the Old Cwmsymlog, or the present East Darren, was one of the most productive of the mines ever found or wrought in the county, and the working of which we must attribute not only the wealth but, by far a greater blessing, the health of a population such as, at all events in our records of history, has never been equalled; and I need not say to the readers of your valuable Journal that the first course of the bringing into London the New River was derived by Sir Hugh Myddelton from the profits obtained from this property, he having made from it a profit, according to his own statements, of 250*l.* per year. I have not time to devote this week to the comparison of workings between this and the celebrated Van Mine, but I intend in my next to enter into detail of what might be achieved in the property if it were worked in the same manner as the Van Mine.

*Gwynnan, Aberystwith, March 28.**ABSAJOM FRANCIS.*

THE WILD DUCK, OR SPORTSMAN'S ARMS.

"Well, men," says Cousin Will, "I hope you have made some discoveries since our last meeting. Our county is big enough, and contains unexplored bodies of all kinds of minerals, sufficient to employ profitably any amount of capital, and I am astonished that people are so mad as to throw away tens of thousands of pounds in re-working 'deep old mines,' and cannot account for it, except present wise miners must think that the miners of a former generation were fools, but the former managers of Great Wheal Bay, Wheal Vor, and Crenver and Abram were able to compete with the biggest men of the biggest mines of the present day, and something more, for they made great profits out of those mines, whereas our modern model managers lost cart-loads of money in them, a title of which properly applied would have discovered new lodes and developed rich mines, and in my opinion, so long as men of capital will not listen to blunt honest truth and a plain statement of facts so long will they continue to lose their money; and all I can say is—'t serves them right' for if a thousand able miners—poor men—had told the promoters of the re-working of the three old mines I have named that there was 'no prospect of success' they would not be listened to for a moment, but let a plausible modern model miner enlarge on the vast improvement in machinery, in the knowledge of mineralogy, geology, and in all the arts and sciences, and he would make it appear that a mine worked under the old system knowledge produce boundless wealth." "I see, sure," says Jan Jewell, "and, like Betty Hocken, the fools that listened to all this were tattered with a disappointment." "I tell ee," says Old Tom, "discoveries are not always improvements, but when a man can do 6*l.* what will cost another man 1*l.* I say that is something like improvement, but I can mind when the old people used to say daddy, and mamma, and porridge; then it come to father, and mother, and broth; and last a come to papa, and mamma, and soup, with pimms, and four-weeks months, and bad times. Now, see, do I call this improvement?" "But look here, old Tom," says Jan Temby, "a bal would pay cost with tin at 60*l.* a ton when a couldn't with tin at 40*l.*" "That's right enuff," says old Tom, "but Jan, my son, bark to me a bit; you say the bals can't pay, and tin at 40*l.* a ton, and if some can just mit cost a lot more must be losing money, but worse and worse, the must rise thousands of tons of tin to make a loss. Now, if the must have a loss, 'twould be better to lev the tin where it is. So I say, men, save your tin, and wait for better price, for tis better to have a loss and keep your tin than lose your money and tin too." "I do believe," says Jan Temby, "there is a good of truth, old Tom, in what thee's been saying, but by all accounts if the secrets of some bals were known some of them made profit when the war in debt, and the price of tin gat all the fault. There's a true old saying—'Pay what you owe, and what your worth you know.' For my part, I don't see why the accounts of a bal should differ from the accounts of anybody in business; everything should be above board; if you are in debt say so, and how much; people would rather know the truth with a loss than have profits with deception." "Well, comrades," says Jemmy Dowa, "I've been barking to your discourse, and to my mind you can say as litte things as grander or bigger men, but, my dear men, if a man isn't rich he's nobody. What a rich man says is gospel, and what a poor man says is no more value than a pile of attle. Now, when I was coming up here to day I had made out in my mind what I would say at our mitten, but harken to what you said I forgot it, so I'm like Capt. Jacky." "What was that," says old Tom. "Why," says Jemmy, "Capt. Jacky was in bed one night, and as he was going to a mitten the next day a thot a would form a speech in his mind what a would say next day at the mitten. So after thinken and thinken over'n for hours he made out a beautiful speech sure enough, so that he'd git up and write'n down, but then a said to himself 'I'm sure ob'n, and will writ'n down in the morning.' So when Capt. Jacky began in the morning to write down his beautiful speech was in the same core as I am, and forgot'n all, for, says Capt. Jacky, trying for life to recollect his speech, 'I was for all the world like a man after a dreadful fit of sea-sickness, trying and training to bring up something, but there was nothing to come up.' Now and I bring up a single idea of my beautiful speech." "That's very well done," Jemmy, says Uncle Henny Treylon, "but you'll surely be able to think upon your speech for our next mitten." "I will try," says Jemmy, "but old Tom don't say how his new dressing machine is getting on." "I tell ee," says old Tom, "that dry dressing when brought to perfection, and my machine is nearly there will be the grandest discovery ever made in mining." *Cousin Jack's Unpublished MSS.*

ROLLING IRON AND STEEL.—In rolling machinery as ordinarily constructed the required reversal of the motion of the rollers is effected either by the "five-wheel motion" or by reversing the steam-engine; but Mr. J. J. CHRISTIE, mechanical engineer, of Wigan, has patented an invention which is claimed to be more simple and compact than either. To the ends of the neck pinions of the rolls, and in place of the ordinary coupling boxes he attaches fixed clutches. On the bed plate of the machinery, and at a short distance from the standards in which the neck pinions work he fixes a pair of standards in which three pinions work. The axes of two of these pinions are coincident with the axes of the neck pinions; the third pinion is on one side, and gears with the other two pinions. Motion is communicated from one of the said two pinions to the other by means of the side pinion, so that the said two pinions both rotate in the same direction, respectively opposite to, and can be made to gear with the fixed clutches on the neck pinions. These sliding clutches are geared to a rocking frame, by the motion of which in one or other direction either the upper sliding clutch can be geared with the fixed clutch on the axis of the upper neck pinion, or the lower sliding clutch with the fixed clutch on the axis of the lower neck pinion. As both the sliding clutches rotate in the same direction, the gearing of one of them to the upper or lower neck pinion communicates motion in the same direction to the said neck pinion—that is, either the upper or lower neck pinion can be geared with the fixed clutch on the axis of the upper neck pinion, or the lower neck pinion with the fixed clutch on the axis of the lower neck pinion. As both the sliding clutches rotate in the same direction, the gearing of one of them to the upper or lower neck pinion communicates motion in the same direction to either the upper or lower neck pinion. As these neck pinions engage with one another they rotate in opposite directions, and the communication of motion in the same direction to the upper pinion produces motion in the geared rolls in a direction contrary to that produced when the said motion is communicated to the lower pinion.

a dividend instead of making a call. However, it might be prudent to make a small call in two or three months time, but this would not be done if it could be prudently avoided.

The report and accounts were then adopted unanimously. The whole of the directors retired, and Messrs. Attenborough, Litchfield, Walker, and Beaumont were re-elected. Mr. J. S. G. Kirkpatrick was elected to a seat at the board in the room of Mr. Arnold Parker. Messrs. Good, Daniels, and Company having been re-appointed auditors.

Mr. ANDREWS proposed, and Mr. CHANDLER seconded, a vote of thanks to the Chairman. The proposition having been carried, the CHAIRMAN briefly replied, and the proceedings then terminated.

AUSTRALIAN CENTRAL GOLD MINING COMPANY.

An extraordinary general meeting of shareholders was held on Wednesday at the offices of the company, Austinfriars,

Mr. E. W. WINGROVE in the chair.

The notice convening the meeting having been read,

The CHAIRMAN said the directors had not prepared any written statement of the affairs of the company, as he proposed to give the shareholders in as few words as possible what was the actual position of their affairs at the present moment. It would doubtless be in the recollection of the shareholders that on February 20 a meeting was called to confirm a special resolution, passed unanimously at a previous meeting, to endeavour to create fresh capital by the issue of 2000 shares of £1 each. At that time the mail from Australia was expected in a few days, and the directors had deferred taking any steps to carry out that resolution until the mail arrived, and they were in receipt of advices. When the mail arrived on March 10 (having left Australia on January 4) the advices were considered to be so unsatisfactory that the directors thought it desirable, although they had only a very limited amount of funds at their command, to send a telegram to Mr. Gill, preparing the answer, asking him to send the latest information as to the condition of the affairs of the company in Australia, in order that those particulars might be laid before the shareholders. [The advice from Mr. Gill, to which he had referred, was then read by the Chairman. It was to the effect that he had been unable, owing to a dip in the vein to raise sufficient gold to meet the current expenses, and had, therefore, been compelled to stop the workings. He would endeavour to make arrangements with tributaries to work the mine, and had meanwhile entered into an agreement with the mortgagees that he (the mortgagor) should keep the pumps going.] He (the Chairman) thought the shareholders would agree with the board that on receipt of such a letter it would, at any rate, be premature to endeavour to raise further capital without further information. The telegram sent by the board to Mr. Gill was as follows:—"Wire position of Central. Answer prepaid." In reply Mr. Gill stated—his telegram being two months later than the advices just read:—

"Pumping only. Tributaries compelled to stop. Could not secure sufficient number of men. Corbett agrees to hand over property on payment of 20% off his debt; otherwise, sale, objecting to pay current pumping expenses. Mine prospects good."

He thought the matter resolved itself really into one which it was for the shareholders to exercise their judgment upon. He did not desire to guide them in any way, but merely to give them the exact position of affairs, in order that they might be able to judge for themselves. The results were, no doubt, very disappointing to everybody, but more especially to the directors, who had looked forward hopefully from time to time for a much better state of things. Still he had no reason to doubt the integrity of Mr. Gill for one moment, as he had stuck very manfully by the company under disadvantages and difficulties which would have deterred most men. He had been working from hand to mouth on most limited means, scraped together as the directors had been able, and the advances had been confined to the liberality of a few shareholders only. He (the Chairman) had every confidence in the veracity, and in the integrity of Mr. Gill, notwithstanding the unfortunate results. He thought that in this belief he was expressing the views of the board generally. (DIRECTOR: Certainly.) The shareholders having all the information before them would have to decide upon what course should be adopted. Perhaps some of the shareholders would form themselves into a committee to consult with the directors and endeavour to determine some steps being taken in the matter—whether the mine should be abandoned, whether sufficient funds should be raised to pay off the liabilities of the company, and place it on a sounder basis, or any other solution which might be arrived at. He would state as closely as possible the present financial position of the company in London up to March 14, and in Australia to Dec. 27 last. Mr. Gill not having been able to send the monthly accounts by the mail which arrived on the 10th inst. The total liabilities on those dates, so far as the directors could ascertain, were 164000. £s. in the colony, including the mortgage on the property, a loan of 30000. raised lately by the shareholders, and some small items, brought the total up to 206400. The assets against this were—he was almost ashamed to mention the amount—19 guineas, and the bulk of that had been spent on the telegrams to and from Mr. Gill.

A SHAREHOLDER asked if it was a fact that Mr. Gill could not pay the working expenses in January?—The CHAIRMAN replied that that was the case. On Dec. 27 the balance in the hands of Mr. Gill was 96. 1s. 7d., having taken credit for the loan of 30000. from the shareholders, the information of which was telegraphed to him on Dec. 11. The loan was raised in consequence of an appeal to the shareholders.

A SHAREHOLDER asked when the mine was stopped?—The CHAIRMAN said it must have been in the month of January, but he could not state the exact date.

After a short discussion, the following resolution was unanimously adopted:—

"That a circular be sent to the shareholders urging them to subscribe for the 2000 new shares lately created, to enable remittance to be sent to Mr. Gill as soon as possible."

The meeting closed with a vote of thanks to the Chairman.

RHENISH CONSOLIDATED MINING COMPANY.

The annual general meeting of shareholders was held at the offices, 2, Coleman-street Buildings, on Wednesday.—Mr. PARKE PITTAIR, chairman of the company, presiding.

The notice calling the meeting was read and the report of the directors, which had been circulated amongst the shareholders, was taken as read.

The CHAIRMAN moved that the report of the directors and the balance-sheet, the report of Mr. Darlington, the consulting engineer, and the report of Capt. Sweet, manager at the mines, be received and adopted. Those reports were so exhaustive in their nature that there was really very little left for him to say. At the Madonna Mine consequent on the large amount of ore extracted, the Altenberg Company had had their attention directed to the lode which this company possessed in the Madonna, and had attacked it on the boundary of their lands, and were erecting a powerful steam-engine and machinery for its development in the Altenberg sett. The Appollinaris, which it was proposed to attack in the early spring, offered as good a prospect as the Madonna. After struggling for some years to keep its head above water, he thought the property was now in a satisfactory condition. He was happy to say that the company was now virtually out of debt. At the last meeting of the board the directors gave notice that the last 10500. which was owing should be paid off in September next. It would have been paid off before, but six months notice was necessary before it could be paid. Capt. Sweet, who was present, would be happy to give the shareholders the fullest information, and to answer any questions.—Dr. REGINALD READ seconded the resolution.

Mr. SLEEV thought the money in hand would be sufficient to pay all the responsibilities of the company.

The CHAIRMAN: Certainly. When the last amount is paid we shall be free from outward debt, but of course there may be something due for working expenses.

Mr. SLEEV thought this statement was very satisfactory.

Capt. SWEET said he left the property the previous day. They had been suffering from heavy floods of water, but the water had now fallen back, and by the end of the present week they would be in a position to raise ore at the 50 fm. lode, and in another week the bottom of the mine would be clear. The south end of the 70 fm. level was in a very productive ore-bearing ground. There was a winze something like 6 or 7 fms., which would communicate also with very productive ground, and in advance the ore was rich. In the north end from the cross-cut the lode was barren, but the lode was not a bad appearance, being composed of quartz, mica, and spots of copper and clay. At the north driving at the 25 they had been cross-cutting with the object of finding the continuation of the main lode. Appearances were promising, and he fancied they were very near the missing lode. They were cutting now with the object of finding the lode which the Altenberg Company had got in a portion of their ground extending further east from this company's working. The floods in January and early in this month had been so exceedingly heavy that it had greatly swollen the river, and forced the water through the sand into this company's mine, and also in the Altenberg mine, and the Altenberg Company were about to put up pumping machinery to take off the water, which would also relieve this company's mine of water. At the last meeting he mentioned that he had 500 tons of lead in reserve, and he could make the same statement now.—Mr. SLEEV: That is satisfactory.

The CHAIRMAN said there was 12,000. worth of ore now in reserve, and the company was virtually out of debt. (Cheers.)

Capt. SWEET said that with regard to the Flora Mine, the lode which cropped out at the surface was of very great width; and, as far as he had seen it in various places, was impregnated with lead ore of a very valuable character, but in order to work it properly there must be a steam engine erected. As regarded the Appollinaris, he had not seen anything of the works and shaft, but according to the statements of the Government Inspector the prospect seemed to be very favourable.

The CHAIRMAN said, in answer to Mr. SLEEV, that the company became possessed of Appollinaris under the concession. He (the Chairman) also said there was no doubt the erection of the engine and pumping machinery at the Altenberg

Mine would be of great service to this company, as it would have the effect of keeping the mine free from the overflow of the river.

The report was then adopted.

The CHAIRMAN proposed the re-election of Mr. H. BURKIN Young as a director of the company. He said that Mr. Burkinyoung had been connected with the company from its early formation, and had given unrewarded attention to the promotion of its interests.

Mr. W. ROBERTS seconded the resolution, which was put and carried.

Mr. BURKIN Young acknowledged his re-election.

On the motion of Mr. PAPPRILL, seconded by Mr. SLEEV, Mr. J. W. Ford, of the firm of Messrs. Kemp, Ford, and Co. was re-elected auditor, with a remuneration of five guineas.

Mr. SLEEV moved a cordial vote of thanks to Mr. Darlington, to Mr. O. S. Young, husband, and to Capt. Sweet for their services to the company. As an early shareholder of the company he had seen the energy and determination with which the company had been carried on. He thought the present report was very encouraging, and that the shareholders might now look forward with hope to the future.

The resolution was seconded and carried.

Mr. DINGWALL moved a cordial vote of thanks to the Chairman and directors. Up to the present time the shares which he held in this company had occupied an ignoble position at the bottom of his security box; they would now be placed in the middle, and possibly the time was not far distant when they would occupy a favoured position at the top.

Mr. SLEEV seconded the resolution, which was put and carried; and the Chairman having briefly acknowledged the compliment the meeting broke up.

WEST GODOLPHIN MINING COMPANY.

The four-monthly meeting of adventurers was held on Tuesday, at the offices, 3, Great St. Helens,

Mr. ROBERT WILSON in the chair.

Mr. CHARLES THOMAS (the secretary) read the notice convening the meeting, which stated that—

"In consequence of the late heavy rains, which have proved so disastrous to many other mines in Cornwall, in addition to our having in the bottom of the mine intersected a cross-course that caused a further influx of water, we have been unable to keep the mine drained, our engine power being unable to contend with the additional strain upon it; it is, therefore, proposed at the forthcoming meeting to consider the subject with a view of obtaining additional pumping machinery to meet the emergency, and to decide on the mode in which the necessary funds should be raised for that purpose. I may further add that the mine has improved very considerably since the last general meeting, and that its future prospects are exceedingly encouraging, the bottom of the mine being so rich that, notwithstanding the low price of tin, we have been able to realise a fair profit, and to pay for additional machinery entirely from the produce of the mine."

The accounts were taken as real, having previously been circulated amongst the adventurers.

The agent's report was read, as follows:—

"March 24.—I herewith hand you statement of work done in the past four months, and distance driven and sunk in the different levels and shafts to the present date, with the value of the lode in the different pitches.—Caulter Lode: Pressure shaft has been sunk below the 60 fm. level 1 fm. 4 ft. The 60 has been driven north 2 fms. 3 ft. 9 in.—Wilson's Lode: The 60 has been driven west 8 fms. 5 ft. 9 in. The 50 has been driven west 9 fms. 5 ft. 9 in. The 40 has been driven west 9 fms. 2 ft. 1 in. The deep adit level has been driven west 7 fms. 2 ft. 3 in. Boulton's shaft has been communicated with the 50 fm. level, and a winze sunk from the 50 to the 60 fm. level west—Caulter Lode. In pressure shaft below the 60 the lode is 8 ft. wide, worth per fathom 70/- per fathom; sunk 9 fms. 4 ft. In the 60 north the lode is 1 ft. 3 in. wide, producing low price tin-stuff; driven 20 fms. 1 ft. 1 in.—Wilson's Lode: In the 60 west the lode is 4 ft. wide, worth 20/- per fathom; driven 16 fms. In the 60 east the lode is 1 ft. wide, yielding low price tin-stuff; driven 49 fms. 2 ft. 7 in. In the 50 driving west the lode is 1 ft. 6 in. wide, producing low price tin-stuff; driven 65 fms. 3 ft. In the 50 driving east the lode is 2 ft. 6 in. wide, worth 25/- per fathom. In Boulton's shaft sinking below the 50 the lode is 2 ft. wide, worth 5/- per fathom; sunk 4 ft. In the 40 driving west the lode is 1 ft. 1 in. wide, producing low price tin-stuff; driven 41 fms. In the deep adit level driving west the lode is 2 ft. wide, worth 4/- per fathom; driven 7 fms.—Pink Lode: In the 50 driving west the lode is 1 ft. wide, worth 2/- per fathom; driven 5 fms. 2 ft.—Wilson's Lode: No. 1 stop in the bottom of the 50 fms. 2 ft. wide, worth 20/- per fathom. No. 2 stop in the bottom of the 50 fms. 10 ft. wide, worth 25/- per fathom. No. 3 stop in the bottom of the 50 fms. 10 ft. wide, worth 12/- per fathom. No. 4 stop in the bottom of the 50 fms. 12 ft. wide, worth 30/- per fathom. No. 1 stop in the back of the 50 fms. 6 ft. wide, worth 10/- per fathom. No. 2 stop in the back of the 50 fms. level west is 2 ft. 6 in. wide, worth 8/- per fathom. No. 3 stop in the back of the 50 fms. level west is 3 ft. wide, worth 8/- per fathom. No. 1 stop in the back of the 50 fms. level east is 4 ft. 6 in. wide, worth 7/- per fathom. No. 1 stop in the bottom of the 40 fms. 4 ft. 6 in. wide, worth 7/- per fathom. No. 1 stop in the back of the 40 fms. 3 ft. wide, worth 4/- 10/- per fathom.—Caulter Lode: No. 1 stop in the bottom of the 50 fms. south is 2 ft. 6 in. wide, worth 4/- per fathom.

We have employed on the mine 124 men, 37 boys, and 24 girls. During the past four months, in common with many other mines in Cornwall, we have suffered very severely from the late heavy rains, and in addition to that we have a considerable increase of water in our 50 and 60, but more especially in the 60, which has increased the water to that extent that we have had very great difficulty in keeping it below the 50. For several weeks past our best tin ground has been under water, which will make very much against our tin sale for this month, having finished stamping all the tin-stuff that we had in stock at surface last month. We have about 16000. worth of copper ore dressed ready for the market, and about 3300. worth more at surface to dress. I calculate that we have sufficient frames fixed for working the slime on our new stamping floors; we shall require two more buildings (round), which we are preparing; we are also making the horses, &c., for fixing the additional eight heads of stamp, which will be got to work against the water begins to fall short at the water-stamps. I am pleased to say the mine is looking very well, and will I believe eventually give large profits to the shareholders, as the lodes are considerably improving as depth is attained.

Mr. SLEEV: I am pleased to say the mine is looking very well, and will I believe eventually give large profits to the shareholders, as the lodes are considerably improving as depth is attained; but in order to sink the mine any deeper, or even keep the water at the present depth for another winter, we must have a larger engine and larger pit-work erected, which I would recommend doing as early as possible. I think it should not be less than a 60-in. cylinder pumping-engine.—JOHN POPP.

The CHAIRMAN said since the last meeting, as the shareholders would have seen from the account which had been sent to them, the profit made had been 717. on the four months' working. Had it not been for the great increase of water which they had had to contend with he had no doubt that, instead of having to propose a call for the purpose of providing the necessary engine, pit-work, &c., they would have been able to pay a dividend. The water had increased so much in the 60, partly from the heavy rains, and partly from the cutting of another cross-course, that the engine was almost overpowered; and, before the breakage which took place could be repaired, the water rose to such an extent that it was impossible to work at the bottom of the mine. It was necessary to send to Hayle to get another lift of pumps, and when these arrived there was such an extra strain on the engine that four or five breakages followed. Although everything was done that could be done under the circumstances, the work of pumping the water out had been one of very great difficulty. Fair progress was, however, made until about a month ago, but the water was now not more than about 1 fm. lower than it was four weeks ago.

Major VALLANCE asked what would be the dimensions of the engine which the committee of management recommended should be purchased?

The CHAIRMAN replied that the present engine was one of only a 20-in. cylinder. It was proposed that they should have about a 60-in. or 70-in. cylinder engine. A 60-in. engine would four times as powerful as the one now in use. They also proposed to put up 14-in. pit-work, which would be of double the power of the pit-work now used. It was estimated that the cost of the engine and boiler, pit-work, &c., would be about 27000. Several engines had been offered, varying from 50 to 90 inches in the cylinder, and there was no doubt, in the present depressed state of the mining interest, that they would be able to purchase a good engine at a very moderate price. Since the accounts were made up the cost amounted to 7450., and the tin sold 524/-, only about 13 tons having been sold, as they had not been able to work the bottom part of the mine for nearly two months, and the loss was, therefore, adding the royalty, fees, &c., about 2500. But against this there was about 1300. worth of copper ore ready for sale, and the balance at the bank would be reduced to 6700. If they could reach the bottom of the mine he believed the returns would quite meet the costs, but should another accident occur the working would again be attended with a loss.

Major VALLANCE asked what the committee suggested should be done in the matter?—The CHAIRMAN replied that the committee had come to the conclusion that the best thing would be to get a 60 or 70 inch cylinder engine, with proportionate pit-work, &c., and that it should be put up as quickly as possible.

The SECRETARY remarked that the position of the mine was such as fully to justify the expenditure recommended. In the bottom of the shaft the cauler lode was worth 70/- per fathom, and in the bottom levels Wilson's lode was worth 80/- per fathom in some places, even at the present low price of tin. The prospects of the mine were such that, even apart from the necessity of keeping the mine properly drained, they would be perfectly justified in going to the expense of a new engine. Previous to the breakage to which the Chairman had referred the mine was making a profit of over 35 per cent. on the capital invested in it.

The CHAIRMAN, in reply to Mr. MASKELL, said the same number of men had been employed during the four months as previously, and they had stoned almost as much stuff, but owing to the water having got into the bottom levels the work had been of a less remunerative character.

Major VALLANCE asked how long it would take to erect the new engine and pit-work?—The SECRETARY, in reply, said the necessary work connected with the erection of the new engine and pit-work would probably take about six months, but it was hoped that the engine in use would carry them through the summer months, and up to the time of the heavy rains, when the new engine would be ready.

Mr. MASKELL enquired if it was proposed to erect the new engine near to the old one?—The CHAIRMAN replied it would be erected on the Pressure shaft.

The SECRETARY stated that operations had been commenced on the Pink lode, in the 50 fm. level, and although the lode was at present small (about 1 ft. wide), it was worth 3/- per fathom at the present price of tin. In all probability a rich lode would be opened there. The shaft would command three lodes—the Pink, Wilson's, and the cauler.

The CHAIRMAN then proposed the reception and adoption of the accounts and agent's report.—Captain GLADSTONE seconded the motion, which was carried unanimously.

On the motion of Major VALLANCE, seconded by Mr. MASKELL, the committee of management—Mr. Wilson, Capt. Gladstone, and Mr. Boulton—were re-elected.

The CHAIRMAN said the only other matter was that of the new engine and pit-work, to erect which a call would be necessary. By having cash to go to market with they would be able to make a much better bargain than if they had not,

and it was, therefore, very desirable that a call should be made. He thought, looking at what had been done during the past four months, although the price of tin had been so low, that the prospects of the mine were such as to warrant the going on, although a twelvemonth ago he thought it was hardly worth while going on. As the shareholders were aware, however, their prospects had very materially improved since that date.

The SECRETARY said there were a great many Cornish mines at the present time, and therefore, there would be no difficulty in getting a suitable engine—indeed, four or five engines of the kind required by the company had already been offered. Capt. Pope, the local manager, had estimated the cost of purchasing and fitting up the engine and boiler, cutting down the shaft, and the new pit-work.

The CHAIRMAN said there was not a single liability on the mine. The labour costs were paid to Feb. 3, and the ore sold to Feb. 24 had been credited. There were very few mines where the accounts were charged up so closely as that, in many cases where the ore was sold in February the costs would only be charged up to about the previous November. Fortunately the ore had stocked about 300 tons of ore at surface previously to the breakage, and this had materially assisted the working.

A 10-in. cylinder would, allowing the usual discount, give about 24000. but there was a balance in hand which together would quite meet the expenditure.

The SECRETARY remarked that the increase of profit shown in the accounts amounted to 7000., was in reality the result of only two months, and not a four months' working, as during six weeks of the time the valuable portions of the mine were under water.

The CHAIRMAN, after a short conversation, moved "In order to provide funds for erecting additional pumping machinery it is proposed that a call of 10/- per share be made, £5 to be paid on or before April 18, and £5 on or before June 1. That a discount of 5 per cent.

Is thought, looking at the price of labour, that the workmen had very much to do at the present time, and already been purchasing and working. The labour is credited. These only he charged about 300 tons of iron, and assisted the 2400 tons. In the account, and not a few portions of the call of 10s per ton, before June, these dates, and the expiration of the seconded had been spent, a larger amount, the usual com-

WORKS, were held at the meeting, March 23, calling the part of his responsibility as he understood the winding-up thought it was through, was framed not coming and no means in, he thought and reasons shareholders was the least of the capital about ones. They had somewhat more capital, had no responsibility, but the world would not be at that, at that 25000, of the enough to do business; there was during a day, which at the engine, not causing some were pro- munity; and, is. But orders began to be called. The upon the work of the works, and the go on longer, in- tencies, they shareholders that the calls that being that is, and informed of creditors, to say that the Chairman asked Mr. Warington Smyth if he would kindly say a few words. Mr. WARINGTON SMYTH, F.R.S., who was received with applause, said that it was with some regret that he heard of the meeting that day, but with a feeling of great sympathy for the mine and the shareholders he proposed to attend that meeting in order to call upon to say a word of explanation, or it might be of advice. He had known the mine for a great number of years, and had closely watched it for a period of 20 years, and although not peculiarly interested in its progress, he believed that he probably yielded to no one in the room in the sympathy which he felt for those who had been disappointed by the results which had occurred. In watching its progress from an early period he had been obliged to see that it had passed from one phase to another, requiring a considerable amount of expenditure, and the difficulties of treatment at different times. It was at first hoped, that, as the lode appeared to be in the direction of Devon Consols, they would be able to find a vein of copper, and from that to 4 per cent., according to the quality of the ore, and the manager had informed him that it was expected that 250 tons of copper would be taken from these veins, which had for years been considered worthless. This being the case, he felt that if this company could do anything approaching such a result, it was absolutely necessary that the old system of working should be abandoned, and it was at once decided to order the machine, believing that a very successful result would ensue. This had been a matter of much anxiety, as the directors were largely interested in the company both personally and by the investments of their friends, and he trusted that the shareholders would support them by every means in their power.

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The CHAIRMAN, in expressing his thanks to Mr. Warington Smyth for his remarks, said if the said did not bear his recommendations in view he would remain them. The Chairman then moved "That it is expedient that powers be given to raise 10,000/- by the issue of shares having such preference, and bearing such interest as the directors may determine." "That the board be requested to consider the expediency of underleasing part of the works, and in case they think it desirable so to do to treat for contracts to underlease, subject to the confirmation of a future meeting." "And that it is desirable that the making of any winding-up order be postponed to allow opportunity for further efforts to revive the company, and that this meeting be adjourned to next Tuesday fortnight at 2 P.M."

Mr. PROVIS said it would be necessary to pass these resolutions, as they could not be present to ask for the dismissal of the winding-up order. He had the opportunity of attending the meeting at Plymouth, and he believed that every alternative that could be considered was discussed. The resolution, which was moved by Mr. Matthea, and seconded by Mr. Pearson, was "That it is expedient that all commercial notes to the unsecured creditors, payable with interest." Up to this time they were not aware of any dissentient to the resolution.

The CHAIRMAN, in reply to Mr. Hill, said there was an amount of 30,000/- per cent. debentures, and 8800/- in 15 per cent. debentures.

Mr. VAN RAILTE seconded the resolutions proposed by the Chairman, which were carried unanimously. Mr. HILL moved "That in order to meet the necessity of providing the labour of the mine, and to relieve the company from pressure by the miners for wages due to them, the shareholders present at this meeting urge upon the board the necessity of paying all calls in arrears as promptly as possible." —Mr. WILSON seconded the resolution, which was carried. The meeting then terminated.

STAMPING MACHINERY.

The monthly meeting of the Mining Institute of Cornwall was held at Camborne, on Tuesday, Dr. LE NEVE FOSTER in the Chair, when Mr. JOHN HOCKING, jun., read a paper "On Stamping Machinery." Amongst others present were Messrs. W. Teague, Husband, Capt. Josiah Thomas (Dolcoath), Evans, Holman, Symons, Cox, Rich, Eustice, Harris, Butlin, W. C. Vivian, G. B. Pearce, Wilkinson, Whear, Bain, Seymour, Campbell, Rich, jun., Trythall, J. Provis, Millyard, J. Hosking, J. R. Daniell, C. Twite, H. J. Lean, W. Teague, jun., M. Harris, Hodge, &c.

Mr. HOCKING, in his paper, said the old process of reducing tin and other ores, where required, to a powder did not seem up to the present time to be superseded, and although many other machines had been tried, none that he was aware of had been proved to do their work cheaper for any length of time, and in the long run, with so little looking after, and capable of standing rough usage. Attempts had been made to convert the steam-hammer into a stamping-engine, and this had been proved to be capable of stamping a large quantity of stuff in a short time, but at a cost which would be simply ruinous. Carr's disintegrator had also been tried, but the ores were not sufficiently reduced, and the trial that he witnessed was not of sufficient duration to enable him to form any opinion as to what the cost would be. Crushers, while adapted for copper and lead, did not reduce tin ores sufficiently fine for the extraction of the tin. Blake's Stone-Breaker was a most efficient machine for breaking the ore from the very rough state in which it was drawn to the surface to size fit for the crusher or the stamps, but he was not aware that it made any pretensions to bring the ore to a powder; in fact, he did not see how it could possibly do so. There were pulverisers of different constructions, but their use was only required to further reduce ores already reduced to a very fine state. Then there were the pneumatic stamps, of which there were two varieties—that patented by Mr. Husband, of Hayle, and that of Mr. Sholl, of Manchester. The results claimed for these machines were exceedingly good, but he was not aware that they had been at work such a continuous length of time as to enable a correct judgment to be formed as to what the amount of wear and tear, and cost of working would actually be. By continuous working he meant for them to be kept running night and day under similar conditions to the present stamps, under the same amount of supervision, and subject to the same rough usage, and the result (say) of six months' working, might be taken as the basis of calculation. At all events, no results of this sort had ever come under his notice, and he was of opinion that the old style of stamps, constructed on the best and most improved principles, was up to the present time less liable to derangement, and would accomplish its work certainly as cheap as any other now in use. He proposed to lay before the meeting what might be considered the average performance of stamps that had been at work for some years, and to compare it with the work of stamps of recent date, and for this purpose he did not think he could do better than give a description and a comparison of the relative merits of the two stamping engines at West Basset—the old and the new—and to point out how the cost of stamping in one was so much less than in the other. The old stamps, which might be taken as a fair sample of a great many in the district, were erected about six years ago, rather to supplement the then existing stamps—axle connected to the whim engine, without the expectation or thought that the mine was so soon going to develop into a large tin-producing mine. Accordingly, what was at first an auxiliary soon became of primary importance. It was gradually added to until the power of the engine and the space at their disposal prevented their going any farther; and although the work was effectively done, yet it was at a greater increased cost than would have been the case had the question been fully investigated at the outset. To this engine, which was one of 3-inch cylinder, were attached five axles of 16 heads each, making a total of 80 heads. The quantity of tin-stone stamped for the week ending Feb. 23 was 458 tons 12 cwt.—about the average quantity, each head stamping at the rate of about 1 ton per day. The quantity of coals consumed during the same period was 32 tons 2 cwt., this including the other work done by the engine, such as repeating the water, &c.; and after making allowance for this he found that every ton of tin-stone stamped was at an expenditure of 169 lbs. of coal. The average number of revolutions per minute was 11.5. This included working back and forth during the dinner hour, and at other times pumping water only. He had made an allowance of 110h for this, which would give a duty to the engine of 44,000,000 or 5 lbs. of coal per horsepower per hour. The new stamps had been planned, through and designed in all its surroundings to reduce the cost of both stamping and dressing to the lowest minimum point. To this engine, which was one of 40-inch cylinder, there were attached four axles of 16 heads each, making a total of 64 heads. They had a full supply of surface water both for condensing and dressing purposes, and the engine was not, consequently, employed in running backwards. The whole power of the engine was, in point of fact, employed in simply driving the stamping machinery. The quantity of tin-stone stamped during the same period as with the old stamps was 621 tons, each head stamping at the rate of 34 cwt. 3 qrs. per day. The amount of coals consumed was 17 tons, or 61 1/2 lbs. for every ton of tin-stone stamped, and the duty of the engine was 67.7 millions. It would be seen at a glance that these figures presented a remarkable contrast compared with the old stamps: in point of fact, one was doing its work at about 40 per cent. less cost than the other. To economise fuel and to produce the best stamping results three things were essential. First, the construction of an engine and buildings of strength to allow of a higher rate of expansion of steam; secondly, boilers of the best and most approved approved construction, and strength to work high pressure steam, and of sufficient power and heating surface without forcing the fires; thirdly, stamps-heads and lifters of increased weight; and for the dressing department a site by which the different dressing processes followed each other by their own gravitation, and thus to avoid the cost of lifting the ore back by hand labour and by artificial means. The duty of all engines depended to a very material extent on the expansion of steam, and it was simply impossible for it to be maintained unless the machinery and buildings were constructed for it. The boilers at West Basset were built on the principle very common in the North, but which had not as yet found much favour in Cornwall. They were of the usual cylindrical construction, with what were known as Galloway's cone tubes introduced into the boiler. These not only gave greatly increased strength, but increased heating surface, and he was perfectly satisfied that they tended to economy of fuel in the generation of steam. He had no doubt that every stamp would do considerably more work if the stone was first broken by a stone-breaker, he believed as much as from 20 to 25 per cent. The stone was not only broken down to a uniform size, but the grain of the stone itself was disturbed, and more ready to be crushed; and, instead of stamping 34 cwt. 3 qrs. per day on an expenditure of 62 lbs. of coal per ton of tin-stone, they would be able to stamp 44 cwt. on an expenditure of 45 to 50 lbs. per ton; and, as the cost of breaking by hand labour and by stone-breaker was about the same, this would be all positive gain. The cost of keeping stamps in repair at the present time was about 3 1/2d. or 3 1/2d. per ton of tin-stone stamped, while four years ago it ranged from 4 1/2d. to 5 1/2d. (Applause.)

The CHAIRMAN said he was sure they had all listened with considerable interest to this paper by Mr. Hocking. It was one of considerable importance. The tin in this country could not be washed like the stream tin in Australia, but must be reduced to powder by stamping and pulverising, and therefore the apparatus they had in Cornwall for that purpose deserved a considerable amount of attention. Mr. Hocking had brought under their notice a very capital comparison, and a very fair one indeed, of the old stamps and the new stamps, both constructed on the old type, and he had shown them that a vast amount of economy might be obtained by using machines of the best construction, by improved boilers, by stamps of greater weight, and for the dressing department a site by which the different dressing processes followed each other by their own gravitation, and thus to avoid the cost of lifting the ore back by hand labour and by artificial means. The duty of all engines depended to a very material extent on the expansion of steam, and it was simply impossible for it to be maintained unless the machinery and buildings were constructed for it. The boilers at West Basset were built on the principle very common in the North, but which had not as yet found much favour in Cornwall. They were of the usual cylindrical construction, with what were known as Galloway's cone tubes introduced into the boiler. These not only gave greatly increased strength, but increased heating surface, and he was perfectly satisfied that they tended to economy of fuel in the generation of steam. He had no doubt that every stamp would do considerably more work if the stone was first broken by a stone-breaker, he believed as much as from 20 to 25 per cent. The stone was not only broken down to a uniform size, but the grain of the stone itself was disturbed, and more ready to be crushed; and, instead of stamping 34 cwt. 3 qrs. per day on an expenditure of 62 lbs. of coal per ton of tin-stone, they would be able to stamp 44 cwt. on an expenditure of 45 to 50 lbs. per ton; and, as the cost of breaking by hand labour and by stone-breaker was about the same, this would be all positive gain. The cost of keeping stamps in repair at the present time was about 3 1/2d. or 3 1/2d. per ton of tin-stone stamped, while four years ago it ranged from 4 1/2d. to 5 1/2d. (Applause.)

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has passed through the grant, the whole of the machinery for every purpose will stand in the valley and to the west of the adit level, the advantages of which for a continual working of the mine in winter and summer are immense. By hand labour about 5 fms. driving per month I calculate could be driven by six good men, and I think with a good boring machine three times that quantity could be accomplished. Supposing the adit level to be driven under the first on ground discovered at surface, and worked away to the westward of Williams' adit before a communication was effected from surface toad, would be 400 fms., which, taking all expenses connected therewith, could be carried out at 10/- per fathom, and cost £4000/-, and to sink a shaft to the depth of the adit under the workings alluded to, would be 60 fms., which we will take at 1/- per fathom, or 9/- ft. I consider the price named not only liberal but much in excess of what the actual cost will be.

For cross-cutting the lode, and driving or opening 100 fms. on the course of it, before calculating on any return being made, we will put down the price at 15/- per fathom, which will be more than ample to cover every expense, and, as in the former instance, much in excess of what the actual cost will really be. To add to the present machinery now on the mine for all the requisite purposes, we will say 1000/- more, which will render it all complete, and amply effective for making very large returns.

For the driving of the deep adit £4000
For a surface shaft to deep adit 900
Cross-cutting and driving 1500
Adit machinery 1000

Total £7400

If this sum is expended and the work carried out as proposed, there is a moral certainty of opening a mine that will last a century, and become the richest and most profitable ever developed in Cardiganshire. There are also excellent offices, smith's an' carpenter's shops, miners' barracks, and other necessary buildings, erected at great cost and in good condition on the mine.

In addition and in connection with the horizontal steam-engine alluded to, I may say that all the necessary pitwork is fixed and in working order to the bottom of Pen-y-faich and Gibb's shaft. Tramways laid throughout the mine, and, in fact, everything that is required to press on the working of the mine. There is also an excellent crushing mill almost ready for working, and a good dressing flooring supplied with jiggings-hutes, &c., so that it may be understood that the 1000/- named would comprise all and every requisite for a thorough working of this mine.

ESGAR-FFRAITH MINE.

This mine lies to the east of the village of Talyllyn about seven miles, and distant from the Llanfihangel Railway Station about eight miles. The vein is of great size, varying from 30 to 60 ft. wide, and in this grant, and immediately to the west of it, has produced millions of pounds worth of silver lead and copper ores. The mine is well supplied with powerful water-wheels, for the purposes of pumping, crushing, drawing, and dressing; for the latter purposes the machinery is most perfect and complete, consisting of patent jiggers, &c., of the most approved construction, and all of which, with the buildings and connections, could not have been erected for a less sum than £5000/- There is also good miners' barracks and other buildings near the mine which are most convenient for carrying out the work, which can be accomplished at a less cost than if the men had to travel a great distance to and from their work daily.

The ground from the westward towards Esgair-Ffraith falls rapidly for nearly three-fourths of a mile, so that the machinery is fixed in a well sheltered spot, and is well supplied with surface water at all seasons of the year.

Although immense quantities of ore have been returned from the mine, the deepest of the workings have only reached a point of 10 fms. under the adit level, the component parts of the lode being a very rich gossan, with carbonate of lead, and very rich copper ore, peacock, and yellow or copper pyrites, and which have been sold for as much as 25/- lbs. per ton. That this great gossan rides, or covers, an immense mass or body of lead ore I have no doubt whatever, but there is as little doubt on my mind, that before the copper gives way to lead, ore tens of thousands of tons of the former will be raised, and that the copper will gradually subside and be taken place by the lead, as is the case in the deepest mines of Cornwall—they making copper near the surface, which gives way to tin ore in depth. As there is a splendid field of machinery on the mine already for its immediate development, with rich copper ground to start the sinking of the present engine-shaft on and from the back over the 10 fm. level, it will not take a very large capital to lay open ore ground enough to bring the mine into a state of good returns and profits. I should, however, strongly advise the opening out of a sufficiently large quantity of ore ground for maintaining the returns and profits of the mines for at least two years before commencing to stop away the reserves, but the ore broken from the sinking of the shaft, the driving of the levels, and the sinking of winzes for ventilation should be returned and made marketable at the time it is broken and raised from the different bargains. I would, therefore, advise the carrying out of the following work:—

To sink the engine-shaft from the 10 to the 20 fm. level, leaving a clear back of 10 fms.—say, 11 fms. at 30/- per fathom, including costs and materials of all kinds, or £2330
Drive the 10 fm. level west 50 fms. at 10/- 500
" 10 " east 50 " 8/- 400
" 20 " west 30 " 10/- 300
" 20 " east 30 " 8/- 240
Sink a winze under the 10 west to 20, 11 fms. at 12/- 132
Sink a winze under the 10 east 11 " 12/- 132
Sink shaft from 20 to 30, 11 fms. at 30/- 350

Total £2364
I believe this work would lay open a sufficient quantity of ore to commence returns of 100/- per month, which should leave a profit of 5000/- per year, and which I believe would go on increasing from year to year. It is impossible to select a finer property for investment. The grant is very extensive, and roads good for carriage of ore.

ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY (LIMITED).

MINA GRANDE AND DIOS PADRE.

Capt. Wm. Clemo, Jan. 18: The tunnel end in Dios Padre has now got into better ground for driving, which I think is the country on the west side of the lode; the ground driven last week was 5 ft. 6 in. There now remains to reach the shaft 82 ft. The water has gone down in the shaft 1 in. only in the past week on account of the rain which fell last Saturday and Sunday. There now remains 57 ft. 1 in. of water in the shaft.

Jan. 25: We have again begun to break ore in the Mina Grande stopes. The stopes have no change to notice since last worked. The tunnel end in Dios Padre has no change since last week; the last week's driving was 3 ft. 6 in.; there now remain to reach the shaft 75 ft. 6 in. The water has not gone down in the shaft in the past week.

Frank W. Breach, Jan. 18: In the Balvanera (Mina Grande) shaft the pumps are in to 24, the bob on surface is erected, and the mine pumped by the engine, which effects a saving on the old mode of hand pumping. The ore is being stopped, and a level driven north from the winze in ore. As soon as the ore, now being knocked down, shows a good result in the pan we shall at once go on driving the 24; but I think this ought to be done out of the profits of the ore from the upper stopes, as I am very loth to devote any of the resources derived from the green ore to exploring for black ore of a quality such as we have in Mina Grande. In the tunnel end in Dios Padre I believe we have entered the country ground without passing any defined wall of the lode; the ground is easy and dry.

Jan. 28: The Mina Grande stopes is very solid, and as soon as Mr. J. H. Clemons return we shall commence roasting the ore for pan beneficio, as in a couple of weeks I hope to have 100 tons ready for the crusher. The tunnel end in Dios Padre is still in fair ground for driving, and good progress is being made. In the shaft the water stands to its level, owing to a heavy stream coming out of the cross-cut, 250 ft. from the surface. As the season advances this will decrease, and cease altogether.

Feb. 1: In the Mina Grande yesterday we came on what appears to be much better ore. It is now being assayed.

Feb. 8: Mr. J. H. Clemons has now returned from Guaymas, and the furnace is now at work roasting the Mina Grande ore for the pan beneficio. The water in the Dios Padre shaft I do not now expect to sink any lower, as the shaft is in the country, through which the water does not find its way. I do not regard it, at any rate at present, as of much moment, as such good progress is being made in the tunnel end that we shall soon be at the shaft, and as our ventilation is still very good we can rise much cheaper and quicker than we can sink. Of course, if money were not an object I would do both at the same time.

TIRITO AND NEW EAST LODGE.

Wm. Clemo, Jan. 18: The taking out of the north arch in Tirito 10 fm. level goes on the same as last week. In the 32 the end south of the winze is now idle. It appears to have got to the end of the ore ground at that height. We are now stopping the back of this level. The end driving north from this winze is still more in the back, but the bottom is poor in this place. We appear to be driving in the bottom of the ore, which is rising fast to the north. At the engine-shaft, sinking below the 42, I mentioned last week that we had cut the lode in the shaft. We have it now all the length of the shaft, but as yet on one side only. It is looking very healthy, and turns out some very good stones of green ore, while the ground around it is very favourable for a lode to lie in. The ground sank last week was 4 ft. We are now 29 ft. 3 in. below the 42. In the stopes in back of the workings around slide, at tunnel level, there is no change to notice since last week. The winze sinking below the tunnel has very much improved in quality this week.

Jan. 25: The taking out of the north arch in Tirito 10 fm. level goes on without any change to notice. The stopes in the 32, south from the winze, is looking well. The orey part of the lode is 4 ft. 6 in. wide, of very fair quality ore. The ore in the north end of the winze is of fair quality also, but is only 2 ft. 6 in. wide. The lode in the bottom of the engine-shaft, sinking below the 42, is now 5 ft. wide, with about 2 ft. 6 in. of ore, but we have not yet got the footwall. The lode is not underlying as much as it did in the levels above. It is letting out water freely, which gave us some little trouble in sinking last week, but it appears to be draining itself now. The ground sank last week was 3 ft. 6 in. We are now 32 ft. 9 in. below the 42. The stopes in back of the workings around the slide, at tunnel level, continues without change. The winze sinking below tunnel continues to improve in quantity and quality.

Feb. 1: Tirito 10 Fathom Level: The taking out of the north arch in the back of this level is now coming to a close. The green ore there is nearly all taken out, but there remains a little black ore yet to take out.—The 32 Fm. Level: The stopes south from the winze has no change from last week. The stopes north from the winze is now idle, as it interferes with the preparations to work in the bottom of the winze. At the engine-shaft sinking below the 42 fm. level the lode has no change since last week. We are now idle for a few days timbering the shaft. The ground sunk in the past week was 3 ft. 9 in. The shaft is now 26 ft. 6 in. below the 42 fm. level. The workings around the slide in the tunnel level are not to notice. The winze sinking below the tunnel has no change to notice.

Feb. 8: Tirito 10 Fathom Level: We have now finished the taking out of the green ore in the north arch in the back of this level; there yet remains a little black ore to take out from this place. We have now commenced to take out the south arch in the back of the 10 fm. level also. The works in the winze below the 32 fm. level are at present idle; we are getting in a stull to work the bottom as well as the back stopes. At the engine-shaft sinking below the 42 fm. level we have finished the timbering; we are now sinking again. There is no change to notice. The ground sunk last week was 1 ft. The shaft is now 37 ft. 6 in. below the 42 fm. level. The stopes in the back of the workings around the slide, in the tunnel level, has no change since last week. The winze sinking below the tunnel is now in a poor floor of ground.

Frank W. Breach, January 18: The Tirito shaft is going down very well. We have 3 ft. wide of lode in the shaft, and it looks very kindly for making ore as we go down. At present the ore is in bands of 6 in. or so, of good ley—green ore. The lode appears to widen as it goes down. As yet we do not see anything of the east or footwall. The presence of the lode makes the ground very easy, and we have to timber the sides of the shaft as we sink. On the 20th I expect to measure 33 ft. below the 42. The ore in the 32 winze seems to be about 40 ft. in length as we rise in the stopes, and is of better quality than we met with in sinking. The south new east lode continues to yield fairly as we rise in the slide. The south new east lode continues to yield fairly as we rise in the slide. I have no doubt we shall have a stop of rough but payable ore from the 10 to the tunnel level.

Jan. 26.—In the Tirito shaft the lode appears to be going more downward, which is a good sign, and the ground (a moderately soft laminated parphyry, next the lode) is very kindly, and gives room for the lode to widen as we go down. The winze in the south new east lode, sinking to the 10, shows that we may expect a stop of ore there when we go down. In the stopes over tunnel level the ore will soon draw to a close, in fact, we have had much more ore out of the old slide than we had any reason to expect. The green ore in the back of the 10, north of the slide, is now all out, and a beginning has been made to take out that on the south of the slide. We shall try our utmost to keep up the present output from the 32 winze and winze sinking in the south new east lode, until the engine-shaft is down, when we may hope for some assistance from there.

Feb. 1.—The Tirito shaft is delayed three or four days this week to put in timber. We could sink the shaft quicker if the ground was harder, as it is too open to hold the powder.

Feb. 8.—In the Tirito we have got in all the timber, and sinking is going on. The lode makes the sides of the shaft very rotten and unsafe without close timbering. We are now going to try and sink the 32 winze deeper, as the engine shaft should have drained the lode to this point, and we still have ore in the bottom.

KAPANGA MINE—THE UNDERGROUND WORKINGS.—At the invitation of Capt. Thomas, the manager and attorney of the Kapanga Company, I met the underground manager, Capt. Andrews, at the office on the mine. Here we rigged out clothing suitable to the occasion, and commenced our descent of one of the finest shafts in the colonies by a zigzag ladder-way, placed in convenient stopes on landings about 15 ft. apart. In the pump department we had a clear view of the pitwork, and coming to the first cistern at 133 feet I noticed a 14-in. column taking the water from another of 10 inches, and working so well that, bearing in mind the late controversy about the Union Beach pump, I concluded that it mattered little whether the increased size be better at the top or bottom of the lifts, nor does the case clearly seem to be a matter of friction. We had gone down many ladders, but still the deep black gulf yawned beneath us, with the everlasting continuous pump joints red-rusty with the mineral water, seeming, indeed, as if they had grown there; while the intermittent rush of water to the cisterns at each stroke, mingled with strange sounding groans, and sobs, and sighs, appeared to the people the gloom with legions of the spirits of the mine. It was easy to understand how Spain and Mexico is often seen at various landings in a deep shaft small excavations or niches faintly ornamented with a crucifix or an image, and a crust of oil kept always burning. Down at last 300 ft. deep (I thought there had been ladders enough for a thousand), clambering over the mullock in the chamber, we traversed a gallery or cross cut 450 ft. long, the walls and roof of which evinced by many a bore-hole the refractory character of the rock penetrated, and arrived at last at the object of our visit:—

The Subterranean Water-wheel: Here we found a large excavation of some 30 ft. square, by 25 ft. in height, with the hanging wall of the lode forming a sloping roof. Massive timbers on the king post principle heavily strapped and bolted flank the walls and roof, and in the centre revolved a water-wheel 20 ft. in diameter, 1 ft. 6 in. in diameter. I saw at once that conditions favourable to this contrivance rarely occur in mining. The water from an old level above was dammed back and then conducted by a flume on to the top of the wheel below, when having done its duty, it was allowed to run into the cross cut leading to the shaft, and eventually was pumped up to the surface. A 6 in. pump was attached to the wheel, and led down a winze in course of sinking, which it was competent to drain for a considerable distance yet to be sunk, while double winding gear, on the clutch principle, was being got ready for the wheel to wind the dirt. I was much pleased with this most useful and economical device, the simplicity of parts, and truth of construction. Its importance may be estimated by the fact that it will render unnecessary for a long time to come the further sinking of the main shaft, and the consequent erection of heavier machinery, while the inconvenience and danger of a steam-engine below is entirely obviated. It was also very gratifying to see such splendid looking country at that depth, with every indication of a future for the mine, while these pressing impressions cost none of their force from the courteous attentions of Capt. Andrews.—*Auckland Evening Standard*, Jan. 30.

NEW ZEALAND KAPANGA GOLD MINING COMPANY.—The water-wheel, 300 ft. underground, to the great surprise of many, is now an accomplished fact; winding truck loads of mullock from a winze now 40 ft. in depth, and pumping water from the same winze through a 6-in. column, at the same time working as steady and as smooth as a timepiece. Many people are led to believe, from previous reports issued, that the management have had to turn water into the mine to drive this extraordinary wheel, and then pump the same to the surface again; but it is not so, and anyone doubtful of the statement should take the first opportunity of inspecting the work, and making themselves acquainted with the details and the manner of its accomplishment. In the first place the water utilised is the natural drainage of the old Kapanga Mine workings, falling from the different drives, winzes, and stopes to the old shaft, and when the present company opened from the new shaft, this, of course, drained the old workings and drew a constant stream of water to be pumped to the surface, whether the water-wheel had ever been planned or not, so that instead of being, as is supposed by many, an extra expense in labour and coal, it is quite the opposite. The wheel is being driven by a motive-power previously running to waste, entailing no expense beyond the first cost of erection.—*Mine Works*: The Drive: No. 5 level is being proceeded with north, towards the old Albion run of gold, as speedily as possible. The reef here is showing 1 ft. wide, and although disarranged at the present face, the management do not expect to make a great show until the vicinity of the old run is met with. The winze, from which the immediate show of gold may be expected, is now cleared out to the bottom of the old workings, and a commencement just made upon solid and new ground, and gold is already showing in the reef. It is the intention of the management to sink this winze 100 feet, then open north and south on the reef, and until these several blocks of ground be opened up and made ready for stopping the quantity of crushing stuff cannot be very extensive. Altogether the prospects of a remunerative return for the shareholders are becoming more apparent, and the value of the property made known.—*Thames Advertiser*, Feb. 9.

Registration of New Companies.

The following joint-stock companies have been duly registered:—

RAVENSCLIFFE MINING COMPANY (LIMITED).—Capital 60,000/-, in 1/- shares. To purchase the Turner Property and Mine, the Port Grove Property and Mine, both situated upon Cape Jackson, Marlborough, New Zealand, and the Duryea Property and Mine, situated upon Yorke Peninsula, South Australia. The company will confirm and adopt an agreement made between the Yorke Peninsula Mining Company (Limited), and also one between F. W. Tucker and Charles Grainger. The subscribers are—F. W. Ward, 46, Hamilton Terrace, St. John's Wood, 200; George Smith, West Bank, Lewisham, bank director, 200; George Clerishaw, 43, Addison Gardens, M.D., 100; R. B. Ottley, 33, Lubbock-square, 200; G. T. Rait, 70 and 71, Bishopsgate-street, 100; C. Grainger, 19, Wellington-street, 1-10; F. W. Turner, 23, Grosvenor-street, Highgate, 100. The directors are—G. Clerishaw, John Darlington, R. B. Ottley, G. Smith, and F. W. Ward, the qualification being 100 shares.

ELTERWATER GREEN SLATE COMPANY (LIMITED).—Capital 30,000/-, in 1/- shares. To acquire the lease and work quarries and beds of slate, flint, stone, &c., within and under certain lands at Elterwater, and Great and Little Langdale, Westmorland, belonging to the trustees of the will of the late J. Robinson and Benson Harrison, and also to Lord Muncaster, according to an agreement made between J. F. Green and Isaac Williams. The subscribers are—Thos. Bell, Appleby-side, chemist, 300; Isaac Williams, Appleby-side, mining agent, 50; W. Lester, Appleby, bank manager, 10; George Armstrong, Appleby-side, gentleman, 80; W. H. Heelis, Hawkshead, Lancashire, solicitor, 50; James Bell, 21, Cross-street, Manchester, stockbroker, 200; W. F. Sim, 17, Lawrence Pountney Hill, 1. The directors are—Moses J. F. Green, W. F. Sim, Thomas Bell, and James Bell, the qualification being the holding of 100 shares.

FRONGOCH SLATE QUARRY COMPANY (LIMITED).—Capital 10,000/-, in 2/- shares. To acquire the Frongoch Quarry, situated in the parish of Towy, Merioneth, held under lease from James Hughes, and about 40 acres of the forest of the River Dwyryd, according to an agreement made between G. W. Cooke of the one part, and S. E. Ashton on behalf of the company. The subscribers (who take one share each) are—S. E. Ashton, Marlow Cottage, Bromley, Kent; merchant; W. Cooke, Fenchurch-street, teak-merchant; J. H. Brady, 13, Crescent, Upton, Essex, accountant; A. Field, 50, Leadenhall-street, printer; C. E. Green, 11 and 12, Bury-street, St. Mary Axe; E. Mathewson, 142, Harley-street, merchant; F. R. Round, United University Club, Colonial Office, clerk. The office of the company is at 11 and 12, Bury-street, St. Mary Axe.

VALENCIA IRON COMPANY (LIMITED).—Capital 15,000/-, in 2/- shares. To acquire iron mines and property in Spain, and to work and develop the same. The subscribers (who take one share each) are—W. Stevens, Springfield, Tulse Hill, manufacturer; J. J. Courtenay, 3, Plowden Buildings, Temple, barrister; G. Matthey, 78, Hatton Garden, assayer; John S. Sellon, 78, Hatton Garden, assayer; George Cook, 78, Hatton Garden, secretary; S. Banks, Hadley Park, Wigton, Salop, engineer; W. Stevens, jun., The Chestnuts, Norwood-road. The directors are—Messrs. W. Stevens, G. Matthey, J. J. Courtenay, the qualification being the holding of five shares.

CLEVELAND BRIDGE AND ENGINEERING COMPANY (LIMITED).—Capital 10,000/-, in 2/- shares. To carry on business as engineers and manufacturers of iron and other bridges. The subscribers are—George Street, Church-street, West Hartlepool, 20; Alfred Wathall, Stockton, 6; H. J. Dixon, Shefford, 10; G. Stephenson, Portland House, West Hartlepool; H. A. D. Dixon, Sharpness, 10; G. Stephenson, 48, H. Rimball, Darlington, 6; W. Foster, Elm Park, Darlington.

PATENT LATH COMPANY (LIMITED).—Capital 50,000/-, in shares of 5/- each. To acquire the property and business of the Lath and Veneer Cutting

Company (Limited), and to acquire the patents of Mr. W. Ellis, C.E., for cutting Lodge, Redbrook Park-road, Blackheath; H. G. Erickson, 10, Union-square, Clerkenwell; L. B. Glenn, 7, Poultney; C. H. Nugent, 7, Kidderminster, Worcester; Macdonald, 19, Hertford-street, Lewisham; Blackheath; James.

CARDIFF THEATRE COMPANY (LIMITED).—Capital 10,000/-, in 2/- shares. To acquire land in Wood-street, Cardiff, in order to erect a theatre, &c. The subscribers are—W. Alexander, Park-place, Cardiff, 10; E. Payne, Castle, 9; T. Williams, 10; W. Blaizeley, Cardiff, 10; C. W. Davies, Ely-place, Llandaff, 10.

MEDITERRANEAN AND NEW YORK STEAMSHIP COMPANY (LIMITED).—Capital 250,000/-, in 10/- shares. To carry on the general business of a steamship company. The subscribers are—G. A. Phelps, jun., 2

UTILISING TIN-PLATE SCRAPS.

The object of the improved process for utilising tin-plate clippings and waste articles made of tin plate, invented by Mr. E. A. PARNELL, of Swansea, is to separate the coating of metallic tin from the iron so as to obtain the latter in the metallic state, and the former as a saleable compound containing that metal. This separation of metallic tin from sheet iron, and also from lead, which may likewise be present as solder, he effects by means of an aqueous solution of a fixed alkaline sulphide—that is to say, sulphide of sodium or sulphide of potassium. The tin dissolves in the solution of the alkaline sulphide, and may be recovered therefrom by various methods, that which he prefers being hereinafter described; metallic iron remains undissolved by the solution of alkaline sulphide; and lead, which may be present, is also undissolved, but is converted to sulphide. He prepares the alkaline sulphide in the usual way—by heating in a furnace to a melting heat a mixture of either sulphate of soda or sulphate of potash with small coal.

By lixiviating the melted mass in water a solution is obtained of monosulphide of sodium or potassium, adapted for his process herein described. But he prefers making use of an alkaline sulphide containing more sulphur than the monosulphide prepared as above; the bisulphide or persulphide being more effective and more rapid in its operation. This bisulphide or persulphide he obtains by simply adding sulphur to the solution of the monosulphide. With the aid of heat, the sulphur readily dissolves in this liquid, thus forming the yellow bisulphide or other persulphide. One part of common brimstone may be taken for four parts of sulphate of soda originally used, or one part of brimstone to five parts of sulphate of potash. A convenient strength for the solution of alkaline sulphide, both for dissolving sulphur, and also for acting on tin scraps is 40° Twaddell.

The application of heat is not essential to enable the solution of alkaline sulphide to dissolve tin, but Mr. Parnell prefers applying heat, as the dissolving of the tin is much accelerated thereby. For the purpose of digesting the tin scraps in the solution of alkaline sulphide he employs a series of four rectangular iron tanks or vats, heated by means either of small fire-places or "dry steam" pipes. These tanks are so arranged and so connected with each other that the liquid which enters into the first, which he calls No. 1 tank, passes successively through the other three, finding exit from the fourth, or No. 4 tank. The tin scraps, contained in an iron cage, are caused to traverse the four tanks in the direction opposite to the flow of sulphide liquor, being placed first in tank No. 4, afterwards in tank No. 3, next in tank No. 2, and lastly, in tank No. 1, which receives the fresh alkaline sulphide liquid. From this the iron scraps are transferred to another tank, and washed with water, after drying they are ready for use. By this continuous operation the liquor passes out of No. 4 tank fully charged with tin; while, on the other hand, the iron scraps being in contact with fresh alkaline sulphide liquor in No. 1 tank are there deprived of all traces of tin. If lead is also present this metal passes into the state of sulphide, which is insoluble in the alkaline sulphide liquor, and may be separated therefrom by filtration. To obtain the tin from the alkaline sulphide liquor he evaporates this to dryness in an iron pan, and roasts the dry residue in a calcining furnace. By exposure to air at a moderate heat oxidation takes place, and the result of such roasting is a mixture of oxide of tin and sulphate of the alkali. He effects the separation of these two substances from each other by lixiviation in water; the alkaline sulphate dissolves and leaves the oxide of the undissolved. The latter after being washed may be reduced to the metallic state by smelting in the usual way, or else it may be used for making stannate of soda. The solution of alkaline sulphate, obtained as above described, he concentrates by evaporation, so as to obtain solid sulphate, which he employs for the re-production of alkaline sulphide.

WET TREATMENT OF SILICATE ORES.

The invention of Mr. MIECZYSLAS KAMIENSKI, of Paris, relates to improvements in the wet treatment of silicate ores of copper, nickel, and cobalt, to obtain the metals or metallic salts. The natural silicates of the form $\text{Cu O Si O}_3 \cdot \text{H}_2\text{O}$ are treated with a strong acid which displaces the silica, and produces a soluble salt of the metal. The hydrate of silica which results from the reaction is also soluble. This silica is separated by dehydrating it at a dull-red heat. The heat ought to be such that the metallic salt will not be decomposed whilst the silica is dehydrated. The dehydrated silica now being insoluble is precipitated when water is added, and it is now only necessary to decant or filter and wash the precipitate of silica, and the whole of the metallic salt is thus separated; such is the system of treatment. Suppose that silicate of copper ($\text{Cu O Si O}_3 \cdot \text{H}_2\text{O}$) is to be treated, the mineral is ground, and a quantity of sulphuric acid proportional to the amount of copper in the ore is mixed with it; this is then exposed to the air for the time necessary for it to form into a pasty and gelatinous mass. The magma is then placed in an iron pan, and submitted to a dull-red heat in any convenient furnace. The completion of the reaction is shown by the cessation of all volatilisation vaporisation of water or acid in excess in the magma. The resulting cake is treated with water; it disintegrates, the sulphate of copper dissolves, the temperature augments, the silica which has been dehydrated by the heat, and has become insoluble, remains in the form of an excessively fine white powder. All that now need be done is to filter with bags, and a limpid liquor is obtained, which contains all the copper in the form of sulphate. The precipitate of silicate is easily washed without the necessity of agitation, so as to remove the last traces of sulphate of copper. The bags, if they are sufficiently large, can, before the final washing of the precipitate, receive successively large quantities of the silica, sulphuric acid, nitric, hydrochloric, acetic, &c., may be used indifferently, but will produce the corresponding metallic salts.

If it be required to treat silicate of nickel, such as is found in the minerals of New Caledonia, having the composition of a double salt, silicate of nickel with the silicate of magnesia mixed with the oxide or the silicate of iron, the mineral in question is dissolved in muriatic acid of commerce diluted with double its weight of water. For this operation the mineral should be finely powdered, and passed through a sieve. The quantity of acid should represent the equivalent corresponding to the nickel, the magnesia, and the iron contained in the mineral. The solution is made in stoneware vessels heated by an oil bath. The operation is complete when the residue, carefully washed, has lost its green colour. The solution is allowed to settle and is drawn off; it contains chlorides of nickel, of magnesia, and of iron. After it has been allowed to stand for some hours the iron is peroxidised by adding an aqueous solution of chlorine, in such quantity that there may be chlorine equivalent to the iron requiring to be peroxidised. This quantity of chlorine will be quite small, for it has only to peroxidise the iron found in a state of protoxide. The rest of the iron exists as peroxides in the mineral. The iron thus oxidised is precipitated from the solution by carbonate of magnesia; the magnesia combines with the chlorine of the chloride, and disengages the peroxide. The quantity of carbonate of magnesia required is an equivalent of magnesia for each equivalent of iron to be precipitated. This carbonate of magnesia is obtained in a pure state from the mineral under treatment in the manner hereinafter described. Air is employed to agitate the liquid, and to remove excess of chlorine to prevent peroxidation of the chloride of nickel.

After that the liquid has been freed from carbonic acid by the action of the air or by agitation, the oxide of iron is found to be completely precipitated. After it has been left for about 12 hours the liquid is passed through a filter; it then only contains chloride of nickel and chloride of magnesia, and it is quite neutral. It is placed in copper bowls, and carbonate of soda is added in quantity almost equivalent to the nickel contained, and it is heated. The carbonate of soda precipitates both the nickel and the magnesia in the form of carbonates, but the carbonate of magnesia becomes decomposed by heat in the presence of the chloride of nickel contained in the liquid, and returns as chloride into the solution, depositing the nickel in the form of carbonates. It should be observed that to avoid having carbonate of magnesia in the deposit it is necessary to have a little less

soda than there is nickel in the solution. The remaining nickel will be recovered, as hereinafter described.

The liquid with the deposit is passed a second time through the filter press; the deposit, which is carbonate of nickel, is carefully washed with water free from earthy salts; then pressed, dried, and set aside for reduction with wood charcoal in a close crucible at a white-red heat continued for two hours or more. The carbonic acid of the carbonate of nickel, as well as its oxide, at this heat is reduced by the carbon forming oxide of carbon, which burns, leaving in the crucible pure metallic nickel mixed mechanically only with carbon, which separates from it when it is thrown into water. The nickel thus obtained in a spongy state is quite pure, and may be melted with other metals to form well-known alloys, or it may be employed in the metallic state. The liquid obtained from the second filtration containing traces of nickel besides chlorides of magnesia and of sodium is again treated by carbonate of soda for the precipitation of the rest of the nickel and of a part of the magnesia; it yields carbonate of magnesia and of nickel, which serves in the next operation for the precipitation of the iron, as has been already described. The remaining liquid when submitted to evaporation yields common salt, which represents all the soda employed as carbonate, the mother liquor (which is but chloride of magnesium) further evaporated and heated in stoneware vessels to a temperature of about 150°. When a jet of steam is passed through the mass yields hydrochloric acid. The magnesia thus obtained is also a useful product.

RAILWAYS IN AMERICA—THE PENNSYLVANIAN SYSTEM.

Historically the Pennsylvania Railroad is probably one of the most interesting in the United States since the many happy recollections which, in the mind of every American, must be awakened by the various scenes which present themselves during the journey will certainly be more numerous than in any similar length of line within the Union. In the introductory chapter full credit is given to the earlier labourers connected with the establishment of railroad locomotion. About 1827, when the American people were displaying such wonderful energy in opening up their extended country, they received the intelligence of the success of steam-power on the railroads of England, and the inauguration of a new system of transportation between the cities of Liverpool and Manchester. Previous to this railroads similar to those in operation in mining districts of Great Britain had been built in America. In 1809 the first experimental railroad track built in the United States was laid out by John Thomson, C.E., of Delaware County, Pennsylvania, and constructed under his direction by Somerville, a Scotch millwright, for Thomas Leiper, of Philadelphia. It was 60 yards in length, and graded 1½ in. to the yard. The gauge was 4 ft. and the sleepers 8 ft. apart. The experiment with a loaded car was so successful that Leiper had the first practical railroad built in the United States constructed for the transportation of stone from his quarries on Crum Creek to his landing on Ridley Creek, a distance of about 1 mile; it continued in use for 19 years.

The principle which governed the early managers of the Pennsylvania Railroad in its construction was to build it out of the "cash subscribed and paid by the stockholders." To accomplish this they determined to make their *bona fide* capital sufficient to cover the necessary expense of its construction and equipment, and to pay the stockholders 6 per cent. from the time their money was contributed. They argued that it was as easy and more just to pay this interest to those who contributed to the enterprise from its inception than to borrow money at usurious rates on bonds, the holders of which too frequently in the railroad history absorbed in a few years the entire property of the undertaking, and left the first promoters without anything in return for their enterprise and industry. The grading of the first 20 miles of the road west of Harrisburg was on let on July 16, 1847, and 15 miles east of Pittsburgh, on July 22. On Sept. 1, 1849, the first division extending from Harrisburg to Lewiston, and on Dec. 10, 1852, the cars were run through from Philadelphia to Pittsburgh. The Pennsylvania Railroad was constructed in a superior manner, and with the improvements since made is undoubtedly the most perfect road in America. The history of the line is throughout most interesting. The successful development of the company's system was in a great measure due to the energy and intelligence of the late Mr. John Edgar Thomson, its president and engineer. He was the son of Mr. John Thomson, already referred to as having planned the first experimental railway. It is mentioned that the ancestors of John Thomson went from England with William Penn, and settled in the vicinity of Philadelphia. He attained a high reputation as a civil engineer towards the end of the last century, and was employed in the construction of some important works, among which was the Delaware and Chesapeake Canal. The several years he was in the service of the Holland Land Company, an organisation which controlled much of the land in North-Western Pennsylvania, and while thus engaged he in 1793 encamped at Presqu' Isle, now Erie, and with one assistant, without other tools than usually attend an engineering expedition, built the schooner White Fish, which he conveyed by ox-teams from the Falls of Niagara to Lake Ontario, thence to where Oswego now stands, and up a small river to Oneida Lake, passing through which and carrying his vessel again by land to the Mohawk he followed that stream to the Hudson, and thence to the Atlantic Ocean. From this he entered the Delaware Bay, and reached Philadelphia, when his schooner was taken to Independence-square where it remained until destroyed by decay. This was the first vessel that ever passed from Lake Erie to New York and Philadelphia. Mr. John Thomson died in 1842. Thoroughly trained and educated in the profession of his father, and inheriting a love for it, Mr. John Edgar Thomson commenced an active railroad career on one of the first important lines built in the United States when only 19 years of age, and continued in the same line of duty for 47 years, rising by merit alone to the first position in his branch of service in America, and probably in the world. When he was chosen chief engineer of the Pennsylvania Railroad he confessedly stood at the head of his profession. He died universally respected in May, 1874.

One of Mr. Thomson's favourite objects was the thorough development of the mineral resources of Pennsylvania, in the value of which he had unlimited faith. Every coal and iron field was thoroughly understood and appreciated by him, and if the great corporation over which he presided could facilitate its development the work was promptly done. The vacancy caused by the death of Mr. Thomson was filled by the election of Col. Scott, first vice-president to the presidency of the company, and led to the advancement of other officers. To raise the quality of the road to the highest standard, each supervisor was directed to prepare on his own division 1 mile of sample track, not limiting him as to cost, but requiring that it be made as perfect as possible. The officers, the supervisors, and the foremen then passed over these sample miles carefully examining each, and at the conclusion of this inspection the most experienced supervisors acknowledged that they had never before known what a perfect track was. As the result of these experimental efforts a standard of track construction was established, which has been in operation since on all the lines of the company. Premiums are awarded after careful annual inspection to supervisors and foremen who succeed in approximating most nearly to the standard; and each of the competitors for these distinctions is facilitated to compare his division with all others on the line, thus giving him the advantage of the efforts of all, and stimulating a laudable rivalry. The cars are also of a very elegant description. The various sections of the line are in turn described, the various points mentioned being invested with much interest by the beautiful engravings with which the description is illustrated. The volume throughout gives every indication of the utmost care and judgment having been bestowed upon its production, and the author may well be congratulated upon the admirable result he has obtained. Whether the reader be interested in the districts served by

the several lines of the Pennsylvania Railroad Company, or be merely desirous of learning something of the history and resources of one of the most important portions of the United States, he will find the work will amply repay careful study.

MINING AND METALLURGY.

An excellent and popularly written treatise on Mining and Metallurgy* by Dr. Gurlit, of Bonn, whose name is already known in this country as a mining engineer, written for new edition of the three volume encyclopaedia—die gesamten Naturwissenschaften—has just been printed as a separate paper, forming a handy little volume of 176 pages. In the introductory chapter a concise and attractive outline of the history of mining among the Asiatics and Egyptians, the Greeks and Romans, and the French and Germans is given. Mining proper is next considered, the mode of occurrence of the various useful minerals, of course, occupying the first place—lodes or veins, beds or stratified deposits, stockwerke, bunches and pockets, stream-works and surface deposits being in turn treated of. Next the mode of seeking by shode pits and boring is considered, and then the methods of working by shovel, pick and gad, and blasting respectively. The kinds of workings are described, and the methods of carrying them on explained, as well as the systems of haulage. Ladders, man engines, and the various other means of getting into and out of the mine are described, and there are sections on ventilation, drainage, surveying, and preparing the ores for market, the last being treated of in a very complete and satisfactory manner. The remaining section treats of metallurgy, and embraces sections on fuel, blast, iron cast and wrought, steel, copper, lead, silver, gold, cobalt and nickel, tin, bismuth, antimony, arsenic, zinc and cadmium, quicksilver, and platinum. So much being treated of in so short a space, it will readily be understood that minute detail is not attempted, yet a very clear outline of each subject treated of is given, and as there are upwards of 100 well executed engravings, the whole will be readily intelligible to those who are not accustomed to mining business. It is difficult to see wherein the treatise could be improved.

THE LIFE OF WILLIAM WHEELWRIGHT.

The biography of a man who has laboured long and earnestly for the welfare of his fellows is at all times interesting, and so many have benefited from the exertions of William Wheelwright that the record of his life will certainly be read by a large number of persons. Considering the almost unceasing political disturbances which have existed in the Spanish-American Republics, it is really surprising that any progress whatever could have been made; yet in Mr. Wheelwright was found a man who, in the face of innumerable obstacles, was able to lay the foundation of a civilisation which will ultimately raise the Spanish-American nations from their present degraded position to one which will entitle them to an honourable place in the world. The biographer remarks that the life of Wheelwright forms a part of the history of the progress of South America during the last 50 years. The disinterested character of his services for the public welfare reveal the compatriot of Washington and Franklin; he is the personification of his country acclimated in South America, and work like his is the best and surest method the rival republic of the North can employ to destroy the despotism which has so retarded progress. Wheelwright's illustrious name is not identified with any partisan warfare, and therefore his biography will not be the rallying point of a political party, as his statue will not be a monument to the greatness of a demagogue. The growth of commerce and industry which Wheelwright has done so much to aid, and the introduction of social and material improvements, are of more vital interest to South America than its wars, which have produced scarcely anything beyond written proclamations of liberty and foolish boastings of progress.

It appears that William Wheelwright was born in Newburyport, Massachusetts in 1798, having descended from an ancient Puritan family of Lincolnshire, one of whose classmates was the classmate and friend of Oliver Cromwell. Of his early history little is known; his life was spent in his native country until he was 23, and he never occupied himself with any details of his personal experience—this is commonly the case with men who have distinguished themselves in industrial pursuits. That the history of a people should overlook the circumstances which have advanced its social progress is quite inconsistent with democratic ideas. When American history shall chronicle whatever interests society at large, war and warriors, politics and politicians will share the posts of honour which they now monopolise with industry and artizans, with commerce and merchants, who are the truest representatives of modern society. Wheelwright's arrival on the Pacific occurred at the time when Bolivar had just destroyed at Ayacucho the tyranny which for centuries had held those countries in an isolated condition. Without intercommunication, without roads, trade, or industry, they were poor, obscure, and cut off from all direct intercourse with the civilised world. This state of things found in Wheelwright the man whom victorious liberty needed to initiate a work of progress in the peaceful arts. To this work he devoted himself successfully for a period of years. He then returned to the River Plate, where Urquiza, the conqueror of Rosas, had just broken the power of those colonial laws which had closed for years the Argentine river ports to the commerce of the world. In accordance with the new situation he had inaugurated the programme of Rivadavia, and in its realisation he found an able co-operator in Wheelwright. Twenty years later, or 50 years from the date of his arrival in that country, the existence of 30 flourishing colonies, a large and increasing system of rail communication, and the utilisation for purposes of commerce of one of the finest natural harbours in the world, all bear witness to the farsightedness and energy of the subject of the biography.

It was the accident of being shipwrecked in 1823 at Buenos Ayres that gave the new direction to Wheelwright's life which secured him such celebrity. Thus Wheelwright was a gift of the waves of the Rio-de-la Plata to South America, his vessel having gone to pieces on the bank of Ortiz. At the port of Buenos Ayres he stepped upon her shores in utter destitution, as did his Puritan ancestors when they disembarked on the coast of Massachusetts two centuries earlier. When Wheelwright reached the Pacific Coast he found everything in an embryo condition, but he ultimately succeeded in establishing the Pacific Steam Navigation, and succeeded in removing the obstacles which the colonial system of trade offered. He sought the co-operation of the Governments of the Pacific. His exertions in London in forming the Pacific Steam Navigation Company are fully detailed. The want of coal was severely felt, being obtainable only from England, at prices which compelled them to purchase speed at more than double its value. It was well ascertained that throughout that coast, but principally in the South of Chili, there existed natural deposits of mineral coal. Its quality, however, remained unknown for want of being tested. Mineral coal was not required for factories, for the simple reason that manufacturing did not prevail to any extent, neither was it demanded for locomotion, or for the manufacture of gas. Science, confirmed by the practical testimony of the people themselves, had raised a doubt as to its adaptability to any of these purposes; whilst Darwin condemned it as worthless. The morro of Talcahuano was, however, selected by Wheelwright, and large quantities of coal have been taken out. The coal is not so dense as the English, burns faster, and leaves much ash, but it is quite good enough for use.

The successes which Wheelwright obtained, and the obstacles he had to encounter, merely repeat the experience of the early railway engineers in England, and the honour which attaches to Wheelwright's name is, therefore, equally great. It is mentioned that the Quarterly Review of 1819 writes regarding the project of the first railway—"We are not advocates of fantastic schemes as having

* "Bergbau- und Hüttenkunde: eine gedrängte Darstellung der geschichtlichen und künftigen Entwicklung des Bergbaues und Hüttenwesens." Von Dr. ADOLF GURLIT. Essen: G. D. Bädeker.

† "The Life and Industrial Labours of Wm. Wheelwright in South America." By J. B. ALBERDI, late Minister of the Argentine Republic to France and England. With an introduction of the Hon. CALEB CUSHING, United States Minister to Spain. Boston, U.S.: A. Williams and Co. London: Trübner and Co., Ludgate Hill.

any relation to works of utility, and we ridicule as impracticable that idea of constructing a railway on which we shall travel by steam. Is there anything more absurd and amusing than the idea of a carriage dragged by steam and travelling at double the speed of our coaches?" In six years Stephenson's locomotion had been realised, and it was in the face of equally discouraging criticism that Wheelwright succeeded in Spanish-America. His biography, therefore, cannot be too widely read, and if it encourages others to equal efforts the value of the record will be inestimable.

RAILWAYS IN NEW SOUTH WALES.

An abstract of the very interesting report to the Hon. John Lackey, Secretary of Public Works, by Mr. John Rae, M.A., the Commissioner for Railways, detailing their progress to the end of 1875, was published in the *Mining Journal*, of December 2, and for the convenience of those in this country desiring to possess the report itself the New South Wales Government have arranged for its publication by Messrs. Tribbner and Co., of Ludgate Hill. By the end of 1875 a total of 437 miles was open for traffic, the unfavourable state of the labour market, and the difficulty of enforcing contracts made out of the colony for work to be done within it, having prevented more rapid progress. Mr. Rae points out that while doubts existed as to the validity of the agreement entered into by persons in other places, but intended to take effect within the colony, it was difficult for the Government to resist the claims of contractors for the extension of time for the completion of their contracts, but as the passing of the Agreements Validating Act of 1876 has removed the doubts that formerly existed, the contractors have been informed that no further extension will be allowed, and that if their works are not completed within the time already granted the contracts will be cancelled, and the penalties strictly enforced. As this rule will apply to all future contracts, the progress of further railway extensions will, it is hoped, be more satisfactory than has been the case with contracts during the last few years. The land taken for the railways has cost about 24/- per acre, or 392/- per mile, including severance, damage, legal expenses, and conveyance, the original claims being nearly twice as much. The entire cost of the railways has been about 16,500/- per mile.

The whole of the locomotives and rolling stock have been kept in thorough repair, and the cost, as usual, has been charged to working expenses. On Dec. 31, 1875, there were 100 locomotives, 344 passenger stock, and 1610 goods stock; but this is quite insufficient for the present and future requirements of the traffic, as it will appear from the appended estimate of the engines and rolling stock that will be required during the next five years; the estimate of these requirements gives 74 locomotives, 233 passenger stock, and 1988 goods stock, which will involve an expenditure of 500,000/- sterling, and more than double the present stock. With regard to the rolling stock, it appears that tenders were invited in the colonies in November last for the supply of 18 passenger and six goods engines, Messrs. Beyer, Peacock, and Co., of Manchester, being at the same time invited by telegraph to send their price and limit of time for the former. There was no colonial tender for the passenger engines, but for the goods engines Mr. Shaw, of Ballarat, tendered at 3995/- each, and naming no time for delivery; and Norts Engineering Company at 4050/- each, first to be delivered in 17 months and the remainder in 24 months; all delivered at Sydney. The tender of Beyer, Peacock, and Co. was 2650/- f.o.b. for the passengers, and 2820/- for the goods engines, delivered in six months. The claims for extras for the goods engines was ultimately reduced to 135/-, and their tender accepted at 2785/- each for the goods engines. Mr. Rae remarks that by adding 350/- for freight, insurance, and erecting the cost will be 3135/- each, or 18,810/- for the whole six, whilst the same names in the tenders of the colonial manufacturers the six would have cost 23,970/- and 24,300/- respectively, and with every desire to deal liberally with colonial manufacturers the Government could not ignore the principles of free trade so far as to accept a colonial tender at so great an advance on English prices. Tenders have been accepted for the manufacture in the colony of 1100 trucks and wagons, and drawings and specifications are in course of preparation for passenger carriages on a somewhat different principle from those in use. Two carriages, one of them with sleeping arrangements on the Pullman principle, have been ordered from America, as a pattern for others to be constructed if more convenient than the carriages now in use, and adapted for the steep gradients of the New South Wales lines.

The dispute with reference to the Parkgate Iron Company's supply of rails of very inferior quality, and far below specification, was referred to in the notice on Dec. 2, and need not be repeated, as it may be hoped that for the sake of the reputation of British manufacturers the company have ere this compensated the Colonial Government for the inconvenience caused, or proved that they have honourably fulfilled their contract. With regard to the revenue of the railways it is shown by carefully prepared tabular statements that about one-third is derived from coaching or passengers and mails, and two-thirds from goods. Of the goods traffic revenue the carriage of live stock contributes one-thirtieth, wool one-tenth, minerals one-sixth, and general merchandise the remaining two-thirds. Coal, of course, represents the chief portion of the mineral traffic, and Mr. Rae refers to the number and tonnage of the vessels which entered and left Newcastle during the last four years. The inward trade was represented by 1583 coasting vessels and 279,225 tons in 1872, against 1963 vessels and 392,146 tons in 1875; the foreign and colonial entries being 876 vessels and 342,514 tons in 1872, against 1162 vessels, and 510,902 tons in 1875. The outwards was—coast-wise 1388 vessel and 202,972 tons in 1872, against 1907 vessels and 236,710 tons in 1875; foreign and colonial, 1902 vessels and 427,845 tons in 1872, against 1341 vessels and 573,826 tons in 1875. The sliding scale for the payment of colliers has kept up the price of coal, and has hitherto been beneficial to the colliery district, but its effect in the competition with English coal in foreign markets has, he remarks, still to be ascertained.

The safety of the New South Wales lines could scarcely be increased, since no passengers have during the last four years been killed from causes beyond their own control, though several have been injured—one on the Western line by an engine backing too suddenly on a train, and several on the Northern from a collision between a passenger and goods train at Newcastle. Three passengers were killed—two from crossing the line, and one from falling asleep on the rails; all in the neighbourhood of Newcastle—from their own carelessness. No servants were killed, and only four injured from causes beyond their own control. Only one passenger was killed in every 911,618 journeys made, and the compensation paid was only 2s. 9d. per 100% of gross earnings, and 1d. per train mile. The report leaves no doubt as to the economy of the New South Wales Railway management, and the care and vigilance of the officers in all branches of the railway department. The facts recorded show also that the expenditure for the construction of the railways is a wise and profitable investment of the public funds on reproductive works which, besides yielding a direct return on the capital expended almost equal to the interest on the money borrowed, confer on the colony indirect benefits which cannot be estimated in money. On the whole the results are encouraging, as they clearly prove that the further the railways have been extended the more profitable they have become. The tendency of railway extension is to reduce the price of commodities to the consumers, and enhance the value of land; to stimulate production by widening the area within which agricultural and garden produce and animal and vegetable substances can be brought to market; to accelerate the development of the resources of the colony, and by rapid and constant intercommunication and interchange of commodities with the neighbouring communities to extend and strengthen their commercial relations; to cement the bond of union between the Australian colonies, and to advance the general prosperity of the country.

SPRING PISTONS.—The invention of Mr. JOHN HUTTON, of Sheffield, relates to pistons for steam-engines, blowing-engines, steam-hammers, pumps, and other similar machinery, and has for its object simplicity of construction, economy in manufacture, reduced friction and less liability to choke up with grease or sediment. He proposes

to provide a spring, by preference of best cast-steel, and curved to a circular or hoop shape, upon which spring he fits blocks or bearings of gun metal or other suitable material, such blocks or bearings being provided with a hole or groove corresponding to section of the steel of which the spring is composed. The portion of the block outside the spring is formed with a double bevelled face, which is caused to press against the inner surface of the packing rings. The number of blocks to be employed will be regulated by the diameter of the piston and the degree of pressure required. Both ends of the spring are inserted in the groove of one of the blocks whereby the spring is retained in a circular or nearly circular form. In combination with the spring and blocks he uses by preference two outer packing rings, each ring having its inner face bevelled to correspond to one of the bevelled faces of the blocks.

DRILLING OR BORING ROCK.

Some improvements in machinery for drilling or boring rock, more particularly applicable for prospecting purposes, wherein a rotary cutter by preference provided with diamonds or gesns acting by abrasion is mounted on the end of a vertical rotating boring-rod which is extended from time to time as the boring proceeds, have been patented by Mr. JOHN VIVIAN, of Whitehaven. He mounts the vertical tubular boring-rod in a bracket or frame attached to a horizontal slide on the end of a carriage. In a bearing at the lower end of this frame is mounted the hollow axis of a bevel wheel through which passes the boring rod, the axis having an internal feather fitting in a longitudinal groove in the boring rod, so that while this is caused to rotate by the bevel wheel, it is at the same time free to slide vertically through it. The bevel wheel is in gear with another bevel wheel on a shaft mounted on the frame, and receiving motion by bevel gearing from the driving shaft mounted on the carriage. The last-mentioned bevel gearing is so arranged that when the slide is moved laterally with the frame, the bevel wheel on the frame can move out of gear with the bevel wheel on the driving shaft. The upper end of the boring rod runs in thrust bearings in a cross head capable of sliding up and down on vertical guide bars on the upper end of the frame. To the cross head is fixed a loop, to which is connected a chain or rope that passes up over a pulley on a pair of shear legs placed over the rock drill, the chain being led down from such pulley over a second pulley, and having its end weighted so as to balance more or less the weight of the boring rod. If desired to put a downward pressure upon the boring rod during the boring operation, this may be effected by passing a chain or chains attached to the said cross head down and under a pulley or pulleys attached to the sliding frame, and then up and down over other pulleys, the end of the chain or chains being weighted to any desired extent.

As the work of boring proceeds the boring-rod slides down through the bevel wheel by which it is rotated, its upper end moving down together with the cross-head along the guides. When it has descended to the bottom of these it is raised again by means of the chains, the upper part carried by the frame is uncoupled from the part in the borehole, and the frame is slid to one side on the carriage to allow the rod to be raised out of the borehole, or to allow an additional length to be coupled on to it. The upper end of the boring rod carried by the frame works in a hydraulic union supplied with a flow of water through the boring rod down the borehole to the cutter. The driving shaft of the machine receives its motion through a pulley and belt from any convenient motor engine; it also imparts motion through spur gearing to a crank shaft mounted on the carriage, and working a force pump for the supply of water to the boring-rod, and this crankshaft also imparts motion when required by gearing to another shaft on the carriage, on which is a barrel for hauling in the chain by which the boring rod is raised. The crank shaft is also provided with winch handles for hoisting the boring rod by hand instead of by the engine. The entire boring apparatus being mounted upon a carriage it can readily be transported to wherever required.

NEW PROCESS FOR PRINTING FELTED AND OTHER FABRICS.—Mr. G. C. GIBBS, engineer, has patented a machine for printing felts and similar fabrics by a new process. Under the old system the pattern was printed on the surface of the material only, but by the new process the patterns are printed completely through, and show as sharp and well defined, and with the colours as bright, on what is usually called the wrong side, as on the right side. A number of practical gentlemen witnessed a series of experiments with the machine on Saturday last, and the general opinion was that it will bring about a total revolution in the mode of treating felts and other fabrics, on which the pattern is now dyed only on one side. The machine also effects great saving in labour and material.

PEAT CHARCOAL.—The importance of the peat charcoal produced in the United States by the Dodge Process for the manufacture of steel was mentioned in the *Mining Journal*, and a sample of the charcoal has now been forwarded to our office for the inspection of those interested. It is observed that the difficulty with peat as a fuel has not hitherto been any lack of value, but in the cost of condensing it so as to make it valuable. The Dodge Process is one of great simplicity, invented by Mr. Dodge after a 25 years experimenting with nearly all the costly machines which have been invented during that time for the manufacture of peat fuel. The fundamental idea is that the peat is ground in a flood of water, and then conveyed to the drying beds by a force pump, through hose, pipes, or troughs. The steam-engine, grinding-machine, and pump are placed upon a cheaply constructed "scow," which floats in the pit made by the excavation of the peat, and is moved directly up to the peat bank, as it is shovelled into the machine, thus avoiding the expense of carting or wheeling the crude bog to the machine, which would be unavoidable if the works were stationary. The drying beds are simply level plats about 30 or 40 ft. square, with earth embankments thrown up around them, so that they will hold about 10 or 12 in. of water, and into these beds the liquid peat is pumped to the depth of 9 or 10 in. and left until the water evaporates, or soaks into the ground, leaving the peat, after a little time, with about the consistency of jelly. After it has settled to 2 or 3 in. in thickness, which it will in a day or two, and still while in a plastic state, rakes are drawn through it so as to leave it in long strips, and when dry enough to handle it is put into cribs, something like the corn cribs used by farmers, and the "manufacture" is ended. Several weeks, perhaps a month or two, of good weather is needed after the peat is cribbed before it is fit for fuel. It is believed that in Canada the invention will prove of immense value, as they have some of the most excellent ore beds on the Continent, which, if their peat deposits can be utilised as a smelting fuel, would become available. The condensed fuel is largely sold as peat carbonite in Syracuse at 8/- per ton, and those who have used it give it a decided preference as compared with either wood or coal.

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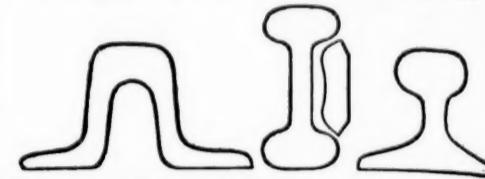
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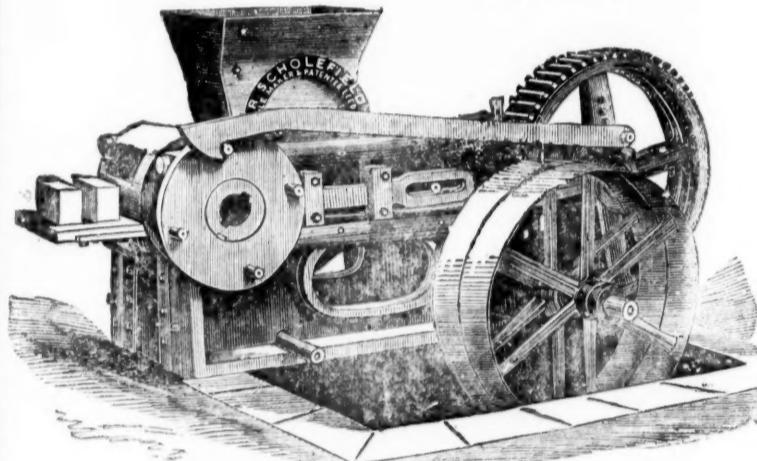
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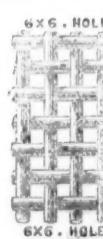
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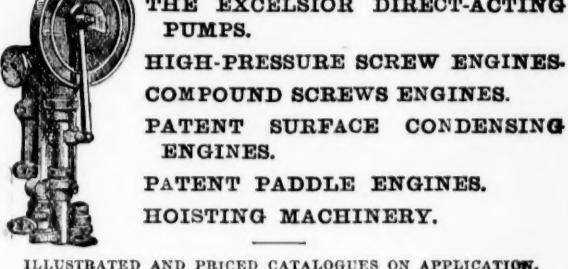
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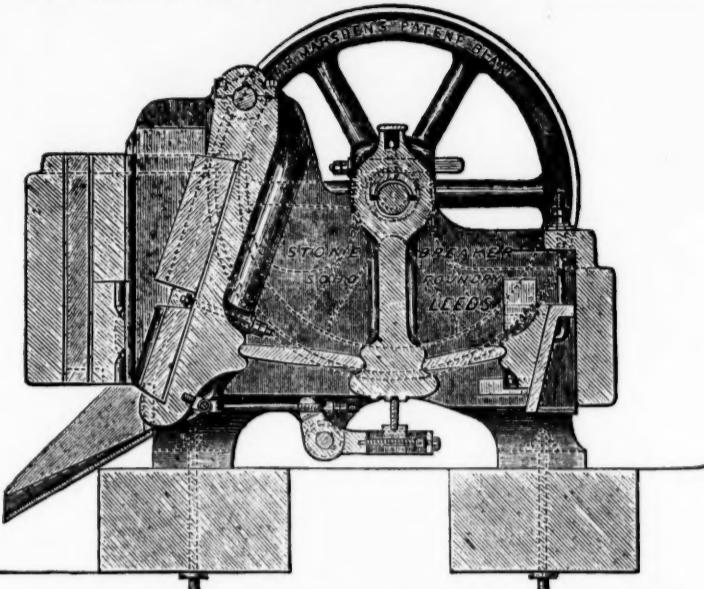
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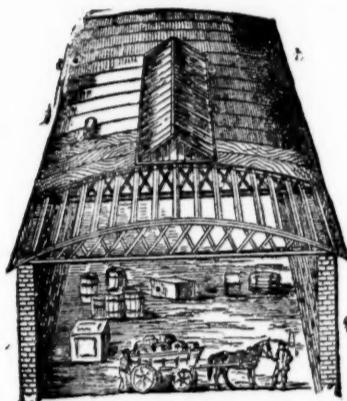
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